

Totally Integrated Automation Portal

Program blocks

Main [OB1]

Main Properties

General

Name	Main	Number	1	Type	OB
Language	LAD	Numbering	Automatic		

Information

Title	"Main Program Sweep (Cycle)"	Author		Comment	Test network
Family		Version	0.1	User-defined ID	

Name	Data type	Default value
▼ Input		
Initial_Call	Bool	
Remanence	Bool	
Temp		
Constant		

Network 1: Machine with simplified PackML modes/states

%DB100
"UN01"

%FB100
"UN01_00_Main"

EN

ENO

Network 2: Axis 1 - Left

Servo axis, procedure and jogging

%DB200
"EM01"

%FB200
"EM01_00_Main"

EN

ENO

Network 3: Axis 2 - Line

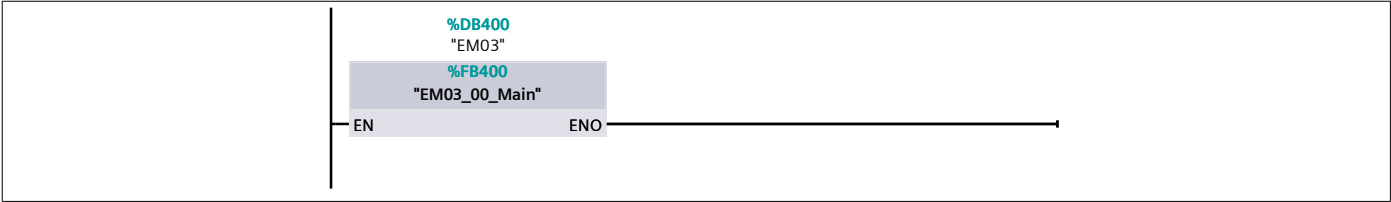
%DB300
"EM02"

%FB300
"EM02_00_Main"

EN

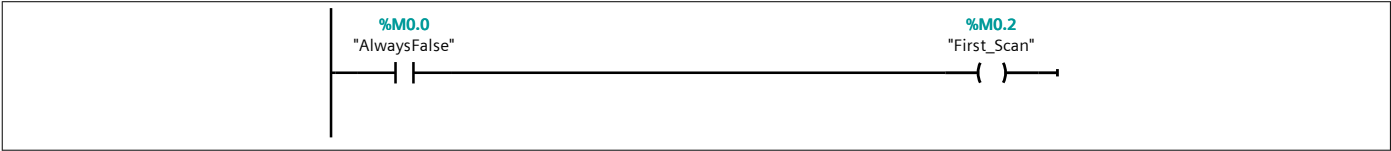
ENO

Network 4: Axis 3 - Right



Network 5:

Reset first scan bit



Program blocks

MC-Servo [OB91]

MC-Servo Properties

General

Name	MC-Servo	Number	91	Type	OB
Language	LAD	Numbering	Automatic		

Information

Title		Author		Comment	
Family		Version	1.0	User-defined ID	

Name	Data type	Default value
▼ Input		
Initial_Call	Bool	
PIP_Input	Bool	
PIP_Output	Bool	
IO_System	USInt	
Event_Count	Int	
Synchronous	Bool	

Program blocks

MC-Interpolator [OB92]

MC-Interpolator Properties

General

Name	MC-Interpolator	Number	92	Type	OB
Language	LAD	Numbering	Automatic		

Information

Title		Author		Comment	
Family		Version	1.0	User-defined ID	

Name	Data type	Default value
▼ Input		
Initial_Call	Bool	
PIP_Input	Bool	
PIP_Output	Bool	
IO_System	USInt	
Event_Count	Int	
Reduction	UInt	

Program blocks

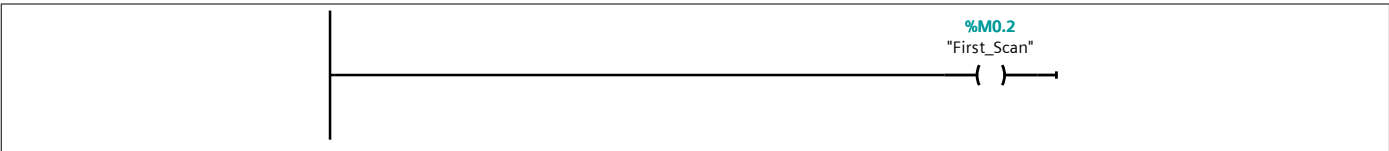
Startup [OB100]

Startup Properties					
General					
Name	Startup	Number	100	Type	OB
Language	LAD	Numbering	Automatic		
Information					
Title	"Complete Restart"	Author		Comment	
Family		Version	0.1	User-defined ID	

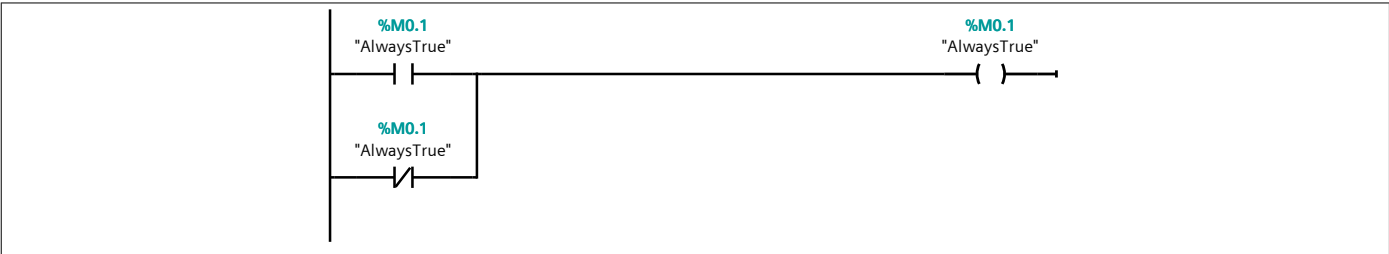
Name	Data type	Default value
▼ Input		
LostRetentive	Bool	
LostRTC	Bool	
Temp		
Constant		

Network 1:

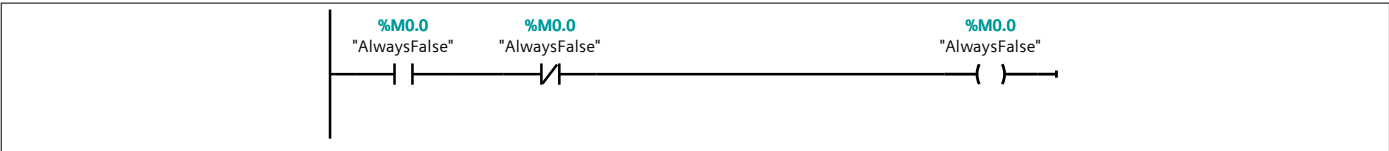
Cleared in last rung of OB1



Network 2:



Network 3:



Program blocks / System blocks / Program resources

MC_TORQUELIMITING [FB1300]

MC_TORQUELIMITING Properties

General

Name	MC_TORQUELIMITING	Number	1300	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_SpeedAxis		
Enable	Bool	false	Non-retain
Limit	LReal	-1.0	Non-retain
Mode	DInt	0	Non-retain
▼ Output			
InClamping	Bool	false	Non-retain
InLimitation	Bool	false	Non-retain
Busy	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

MC_MOTIONINVELOCITY [FB1341]

MC_MOTIONINVELOCITY Properties

General

Name	MC_MOTIONINVELOCITY	Number	1341	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_SpeedAxis		
Enable	Bool	false	Non-retain
Velocity	LReal	0.0	Non-retain
Acceleration	LReal	0.0	Non-retain
PositionControlled	Bool	true	Non-retain
▼ Output			
Busy	Bool	false	Non-retain
CommandAborted	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

SCALE [FC105]

SCALE Properties

General

Name	SCALE	Number	105	Type	FC
Language	SCL	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	CONVERT	Version	1.0	User-defined ID	SCALE

Name	Data type	Default value
▼ Input		
IN	Int	
HI_LIM	Real	
LO_LIM	Real	
BIPOLAR	Bool	
▼ Output		
OUT	Real	
InOut		
▼ Return		
Ret_Val	Word	

Program blocks / System blocks / Program resources

MC_MOVEJOG [FB1203]

MC_MOVEJOG Properties

General

Name	MC_MOVEJOG	Number	1203	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_SpeedAxis		
JogForward	Bool	false	Non-retain
JogBackward	Bool	false	Non-retain
Velocity	LReal	100.0	Non-retain
Acceleration	LReal	-1.0	Non-retain
Deceleration	LReal	-1.0	Non-retain
Jerk	LReal	-1.0	Non-retain
PositionControlled	Bool	true	Non-retain
▼ Output			
InVelocity	Bool	false	Non-retain
Busy	Bool	false	Non-retain
CommandAborted	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

MC_RESET [FB1207]

MC_RESET Properties

General

Name	MC_RESET	Number	1207	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_Object		
Execute	Bool	false	Non-retain
Restart	Bool	false	Non-retain
▼ Output			
Done	Bool	false	Non-retain
Busy	Bool	false	Non-retain
CommandAborted	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

MC_HALT [FB1200]

MC_HALT Properties

General

Name	MC_HALT	Number	1200	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_SpeedAxis		
Execute	Bool	false	Non-retain
Deceleration	LReal	-1.0	Non-retain
Jerk	LReal	-1.0	Non-retain
AbortAcceleration	Bool	false	Non-retain
▼ Output			
Done	Bool	false	Non-retain
Busy	Bool	false	Non-retain
CommandAborted	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

MC_POWER [FB1206]

MC_POWER Properties

General

Name	MC_POWER	Number	1206	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_Axis		
Enable	Bool	false	Non-retain
StartMode	DInt	1	Non-retain
StopMode	Int	0	Non-retain
▼ Output			
Status	Bool	false	Non-retain
Busy	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / System blocks / Program resources

MC_MOVEVELOCITY [FB1205]

MC_MOVEVELOCITY Properties

General

Name	MC_MOVEVELOCITY	Number	1205	Type	FB
Language	Motion_DB	Numbering	Automatic		

Information

Title		Author	SIMATIC	Comment	
Family	MC_1500	Version	8.0	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
Axis	TO_SpeedAxis		
Execute	Bool	false	Non-retain
Velocity	LReal	100.0	Non-retain
Acceleration	LReal	-1.0	Non-retain
Deceleration	LReal	-1.0	Non-retain
Jerk	LReal	-1.0	Non-retain
Direction	Int	0	Non-retain
Current	Bool	false	Non-retain
PositionControlled	Bool	true	Non-retain
▼ Output			
InVelocity	Bool	false	Non-retain
Busy	Bool	false	Non-retain
CommandAborted	Bool	false	Non-retain
Error	Bool	false	Non-retain
ErrorId	Word	16#0	Non-retain
InOut			
Static			

Program blocks / 0_UN01_Winder

UN01_00_Main [FB100]

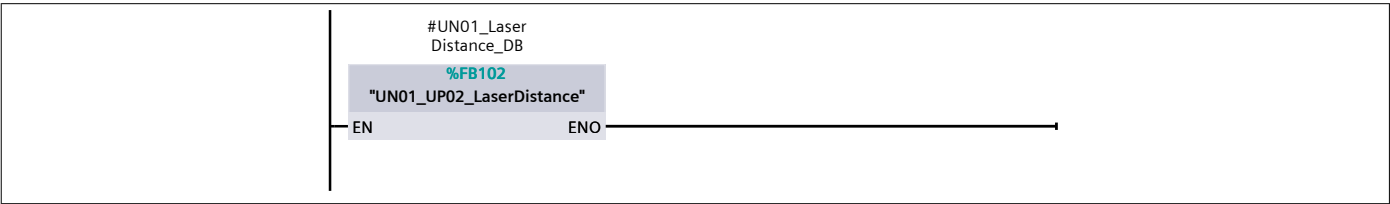
UN01_00_Main Properties					
General					
Name	UN01_00_Main	Number	100	Type	FB
Language	LAD	Numbering	Manual		
Information					
Title	Example machine for sim- plified PackML	Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
UP01_PackML	"UN01_UP01_Pack ML"		
Lamp_Flash_Tmr	TON_TIME		Non-retain
Lamp_Flash	Bool	false	Non-retain
UP01	"UN01_UP00_Pro- cedure"		
UN01_LaserDistance_DB	"UN01_UP02_Laser- Distance"		
Temp			
Constant			

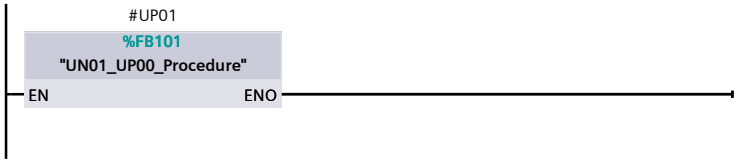
Network 1: PackML



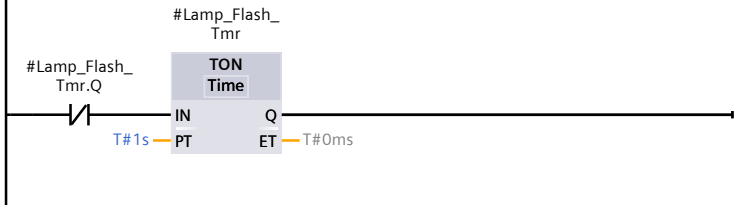
Network 2:



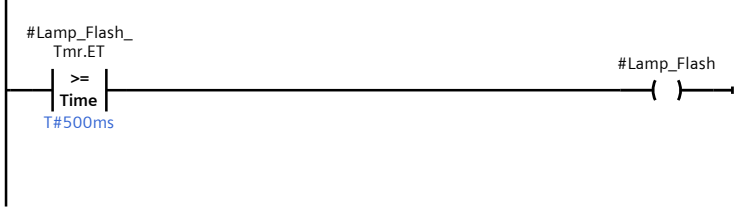
Network 3:



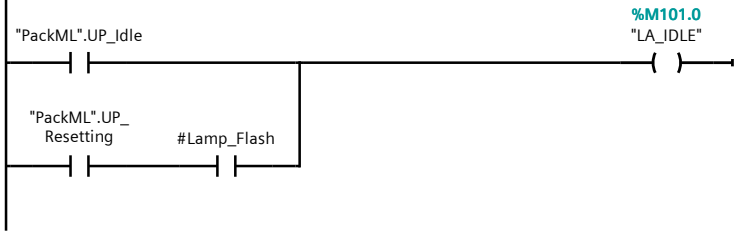
Network 4: Timer for flashing indicators



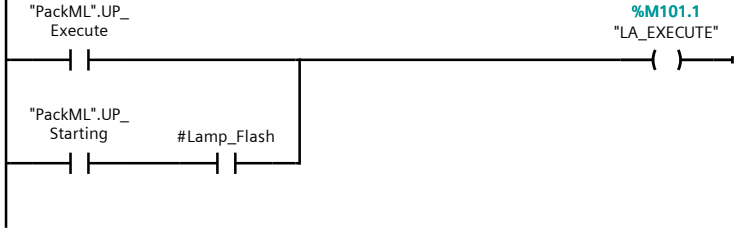
Network 5: Flash bit for flashing indicators



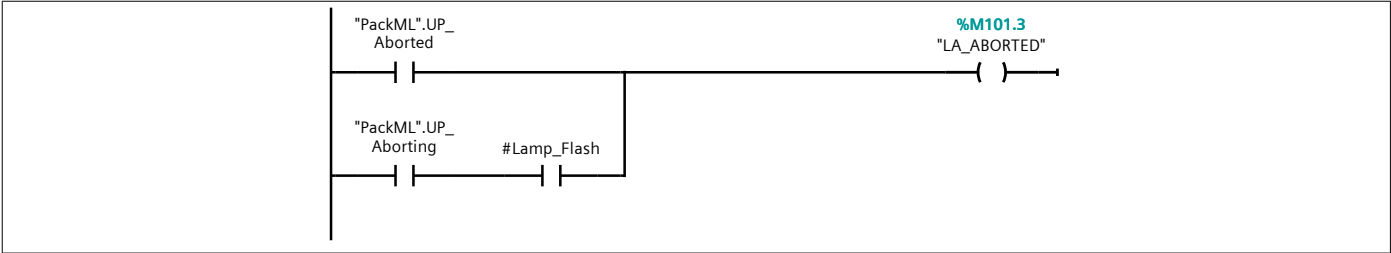
Network 6: Idle/Resetting state indicator



Network 7: Execute/Starting state indicator



Network 8: Aborted/Aborting state indicator



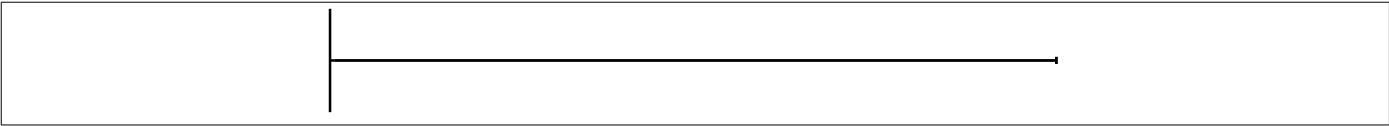
Program blocks / 0_UN01_Winder

UN01_UP01_PackML [FB105]

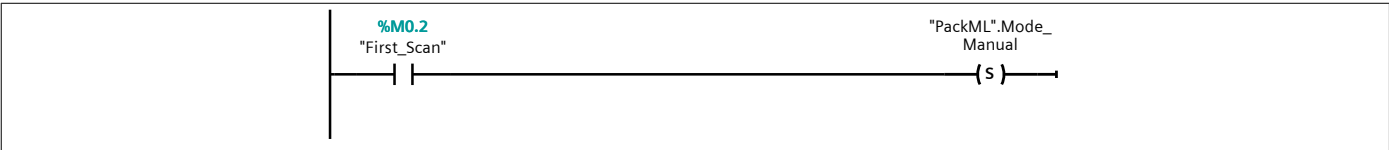
UN01_UP01_PackML Properties					
General					
Name	UN01_UP01_PackML	Number	105	Type	FB
Language	LAD	Numbering	Manual		
Information					
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
ModeChgTrans	Bool	false	Non-retain
ModeChg2Trans	Bool	false	Non-retain
Wrk_Instr_Err_Trans	Array[1..32] of Bool		Non-retain
Temp			
Constant			

Network 1: Handle Mode

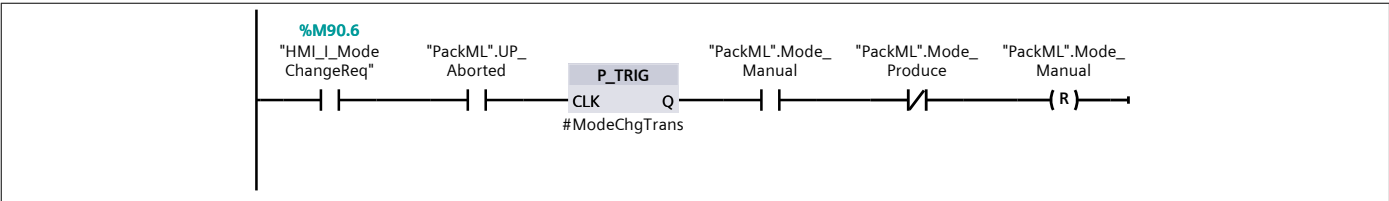


Network 2: On first scan - set to manual mode

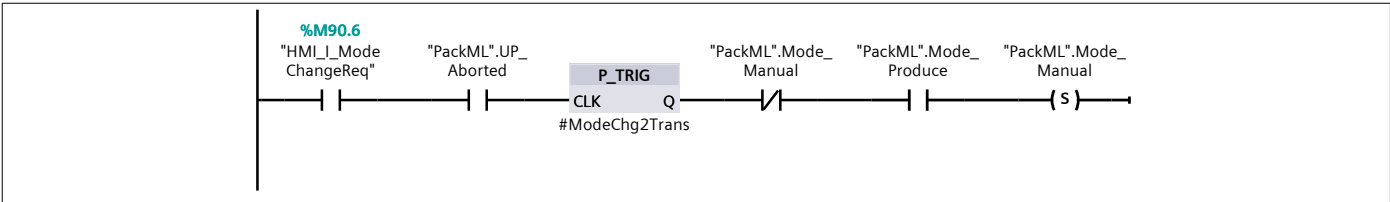


Network 3: Toggle between modes

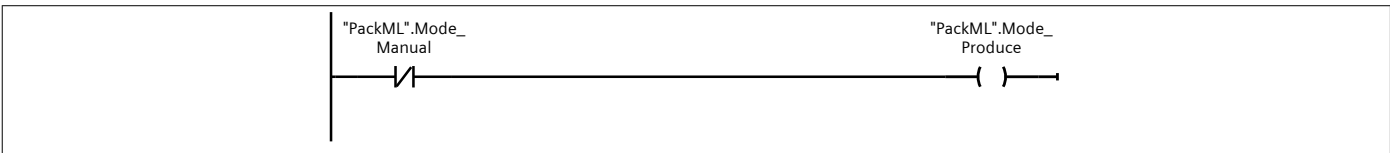
Only allowed when aborted



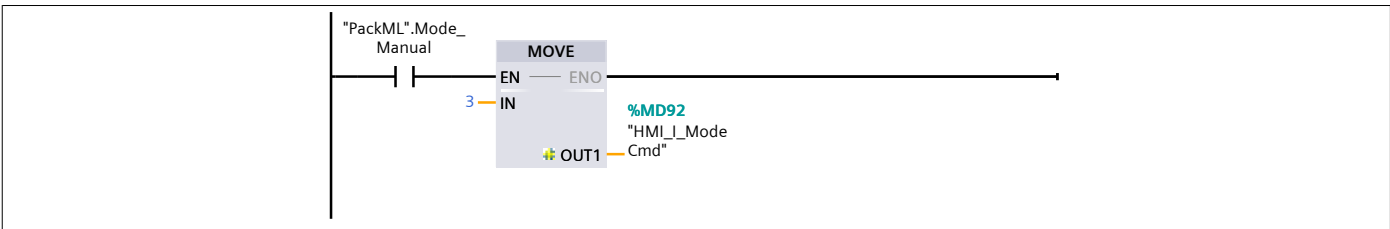
Network 4:



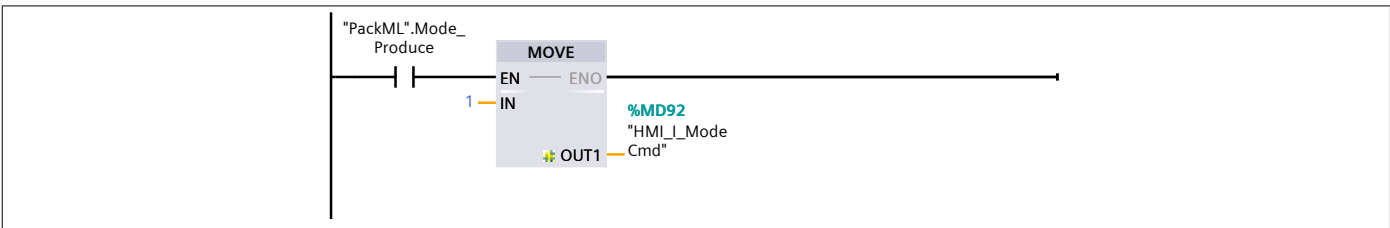
Network 5:



Network 6: Display mode for operator



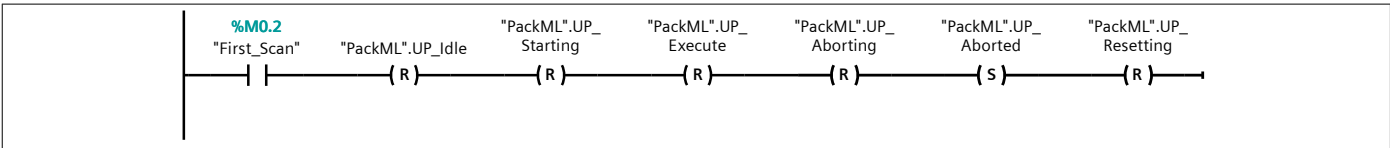
Network 7:



Network 8: Handle states

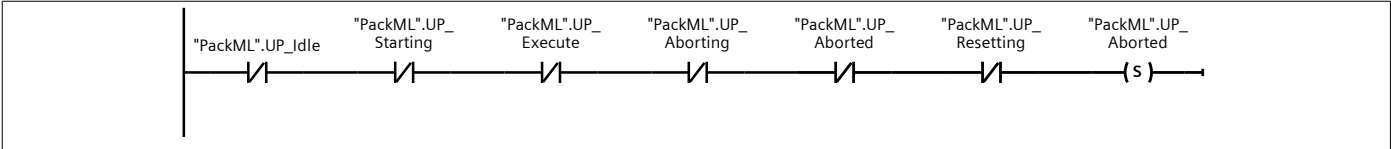
Network 9: First scan

First scan - set to ABORTED state



Network 10: No states active

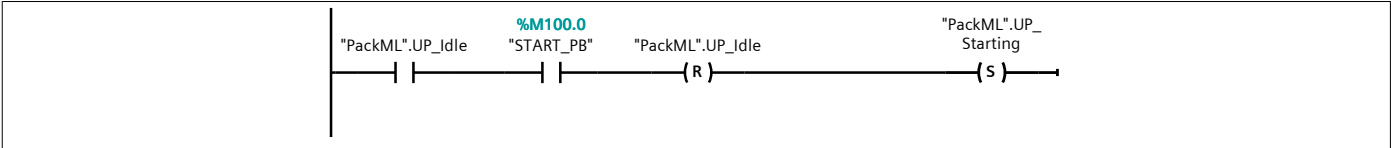
If no PackML states active, set to ABORTED. This happens if updated software is downloaded and processor does not transition from STOP to RUN



Network 11: Transition from IDLE to STARTING

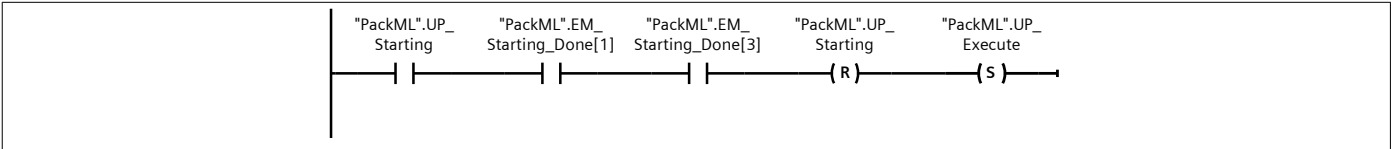
IDLE -
Wait for start pushbutton press.

Next state is STARTING

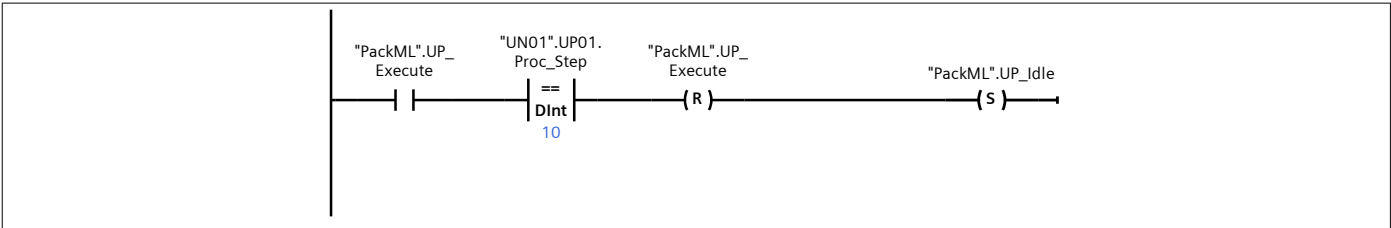


Network 12: Transition from STARTING to EXECUTE

Wait for all axes to start.

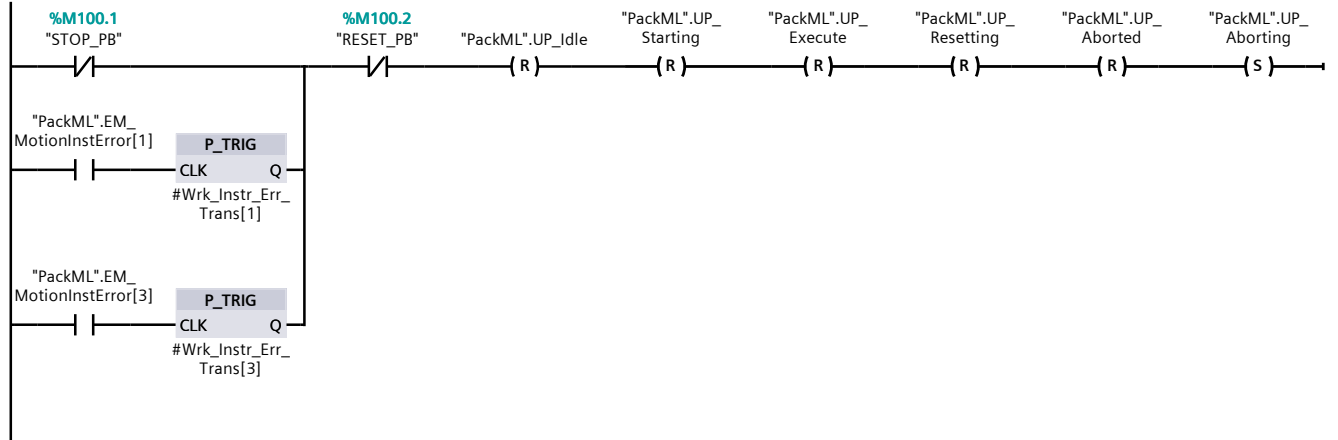


Network 13: Transition from EXECUTE to IDLE at last step of unit procedure



Network 14: Transition to ABORTING

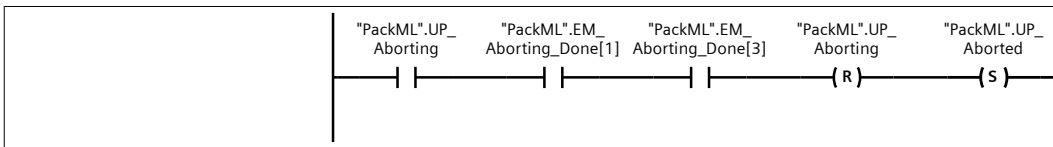
ABORTING -
From any state if stop or error in motion blocks for any axis.
On error transition so source of error can persist and not keep triggering Abort



Network 15: Transtion from ABORTING to ABORTED

Exit when all axes aborting complete

Next step is ABORTED

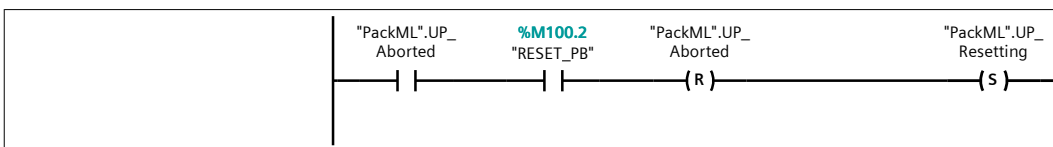


Network 16: Transition from ABORTED to RESETTING

ABORTED -

Stay in state until reset pressed.

Next state is RESETTING

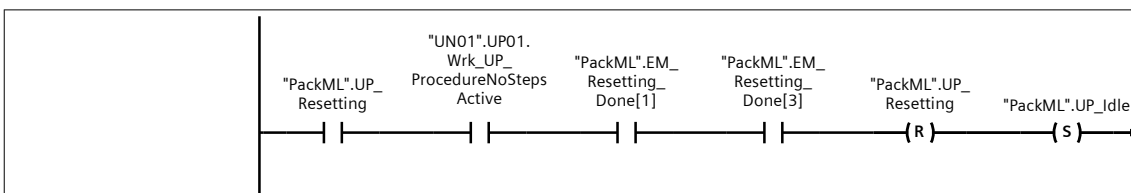


Network 17: Transition from RESETTING to IDLE

RESETTING -

Wait for all axes to finish resetting.

Next step IDLE



Program blocks / 0_UN01_Winder

UN01 [DB100]

UN01 Properties

General

Name	UN01	Number	100	Type	DB
Language	DB	Numbering	Manual		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
UP01_PackML	"UN01_UP01_PackML"		False
Lamp_Flash_Tmr	TON_TIME		False
Lamp_Flash	Bool	false	False
UP01	"UN01_UP00_Procedure"		False
UN01_LaserDistance_DB	"UN01_UP02_Laser-Distance"		False

Program blocks / 0_UN01_Winder

PackML [DB10]

PackML Properties

General

Name	PackML	Number	10	Type	DB
Language	DB	Numbering	Manual		

Information

Title	Machine Data	Author		Comment	Machine Data
Family		Version	1.0	User-defined ID	

Name	Data type	Start value	Retain
▼ Static			
Mode_Manual	Bool	false	False
Mode_Produce	Bool	false	False
UP_Aborted	Bool	false	False
UP_Aborting	Bool	false	False
UP_Execute	Bool	false	False
UP_Idle	Bool	false	False
UP_Resetting	Bool	false	False
UP_Starting	Bool	false	False
EM_Aborting_Done	Array[0..31] of Bool		False
EM_Execute_Done	Array[0..31] of Bool		False
EM_Resetting_Done	Array[0..31] of Bool		False
EM_Starting_Done	Array[0..31] of Bool		False
EM_MotionInstError	Array[0..31] of Bool		False

Program blocks / 0_UN01_Winder

UN01_UP00_Procedure [FB101]

UN01_UP00_Procedure Properties

General

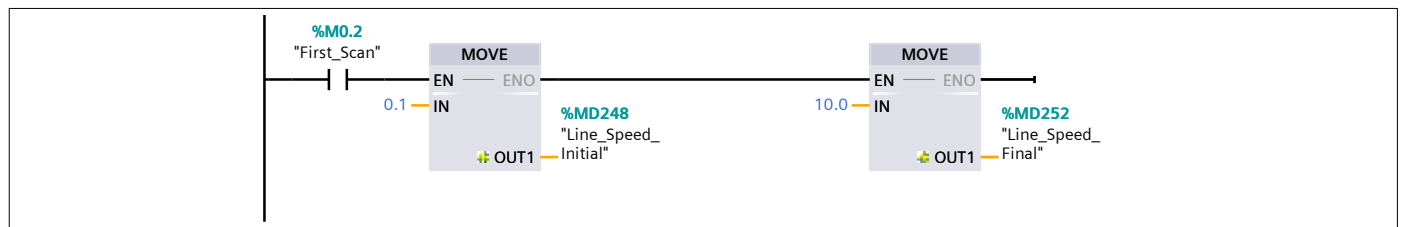
Name	UN01_UP00_Procedure	Number	101	Type	FB
Language	LAD	Numbering	Manual		

Information

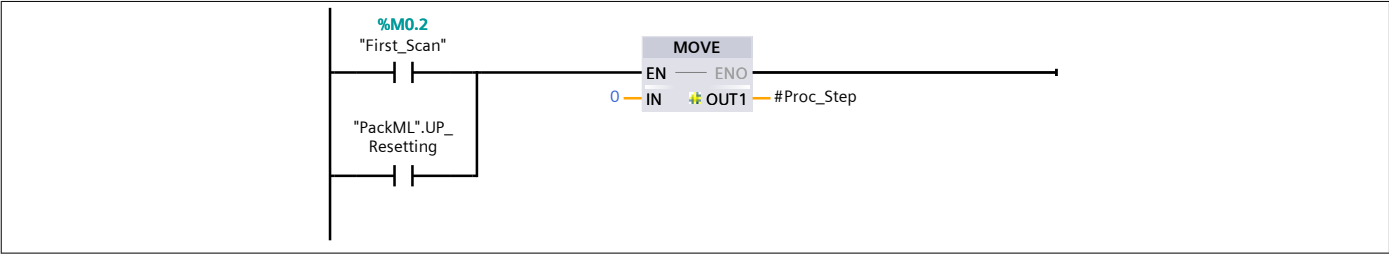
Title	Winder Program for Left axis control as unwind-er/rewinder	Author		Comment	Right axis is treated as line motor, setting the line speed
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
Proc_Step	DInt	0	Non-retain
Proc_StepDn	Array[0..31, 0..31] of Bool		Non-retain
Tag	Bool	false	Non-retain
Index	DInt	0	Non-retain
Wrk_UP_ProcedureNoStepsActive	Bool	false	Non-retain
Ramp_Up_Tmr	TON_TIME		Non-retain
Up_Preset_Time	DInt	0	Non-retain
Up_Elaps_Time	DInt	0	Non-retain
Hold_Constant_Tmr	TON_TIME		Non-retain
Ramp_Down_Tmr	TON_TIME		Non-retain
Down_Preset_Time	DInt	0	Non-retain
Down_Elaps_Time	DInt	0	Non-retain
End_Condition	Bool	false	Non-retain
Min_Run_Tmr	TON_TIME		Non-retain
Temp			
Constant			

Network 1: First scan initializes initial and final line speeds

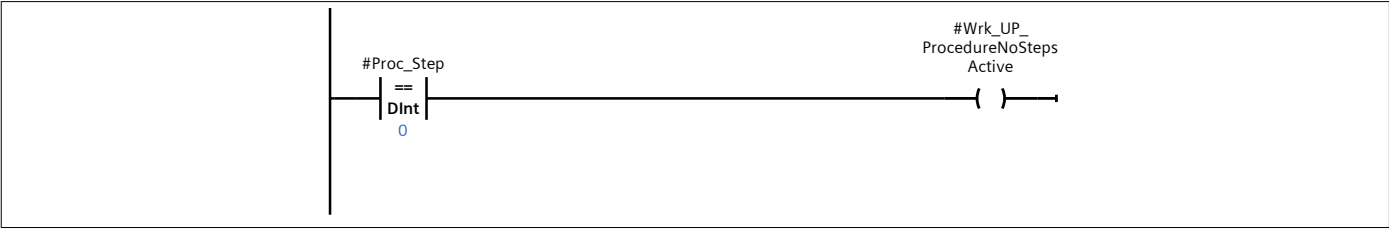


Network 2: First scan or resetting - clear all steps

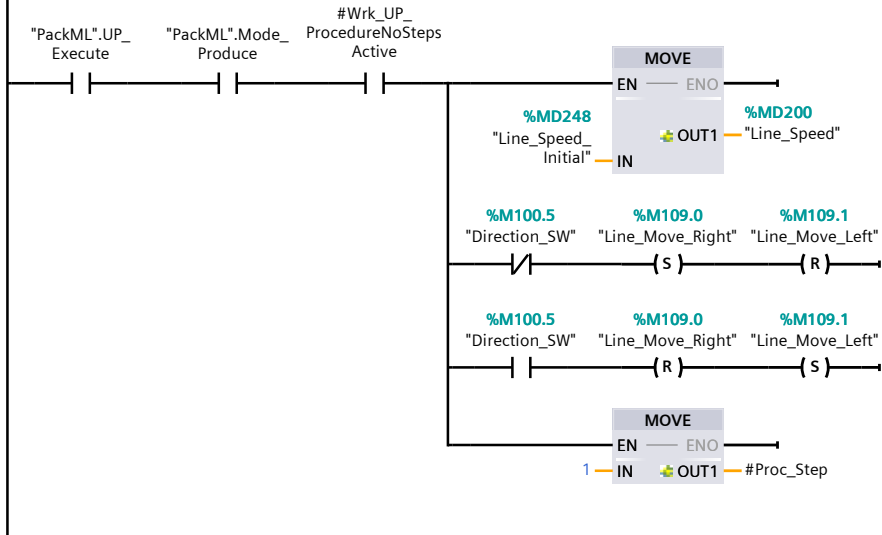


Network 3: No procedure steps active

Used by RESETTING state and initial execute step

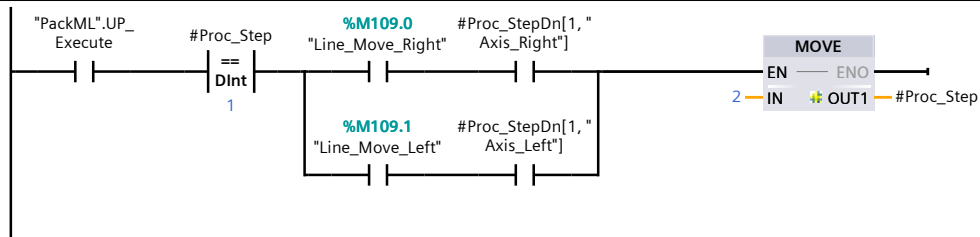


Network 4: Simple end condition. Source radius below minimum or destination above maximum



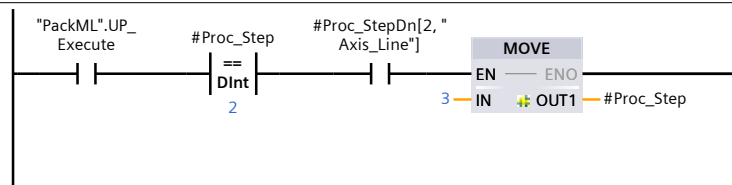
Network 6: Step 1 - Start rewindier axis

Line moving right, start the right axis. Moving left, start the left axis



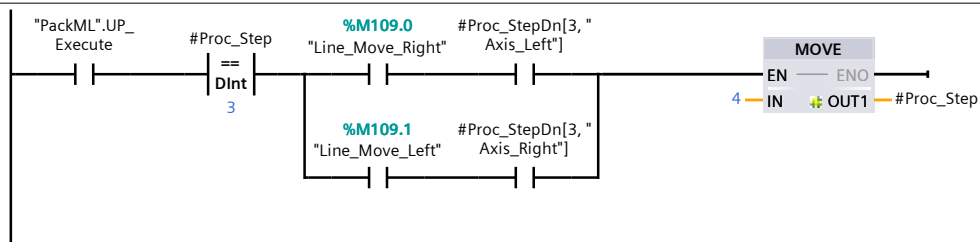
Network 7: Step 2 - Start line axis

Axis does not exist, so short the step complete indication from the axis

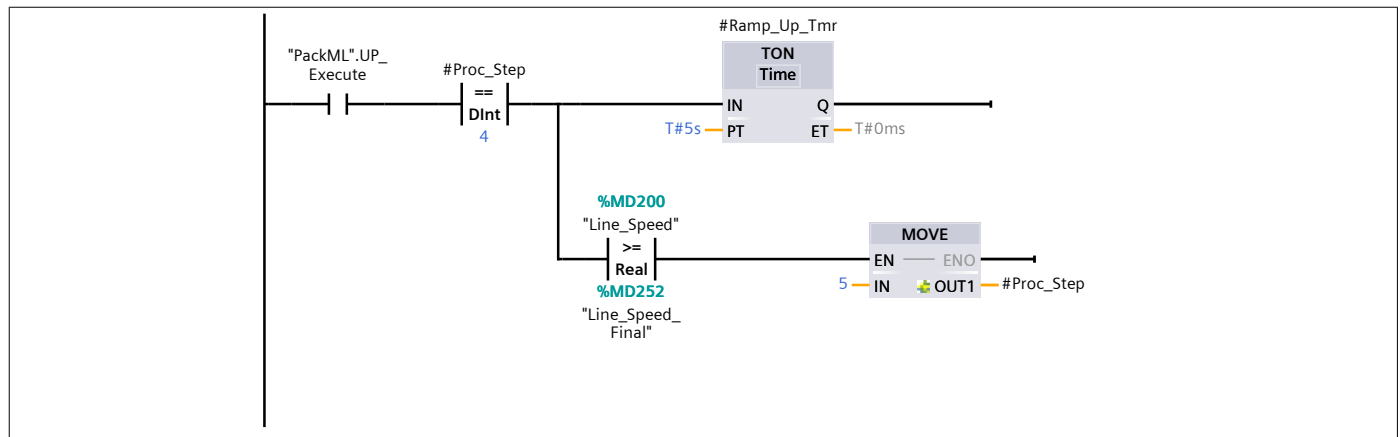


Network 8: Step 3 - Start unwinder axis

Line moving right, start the left axis. Moving left, start the right axis



Network 9: Step 4 - Ramp up to line speed



Network 10: Calculate line speed as ramp

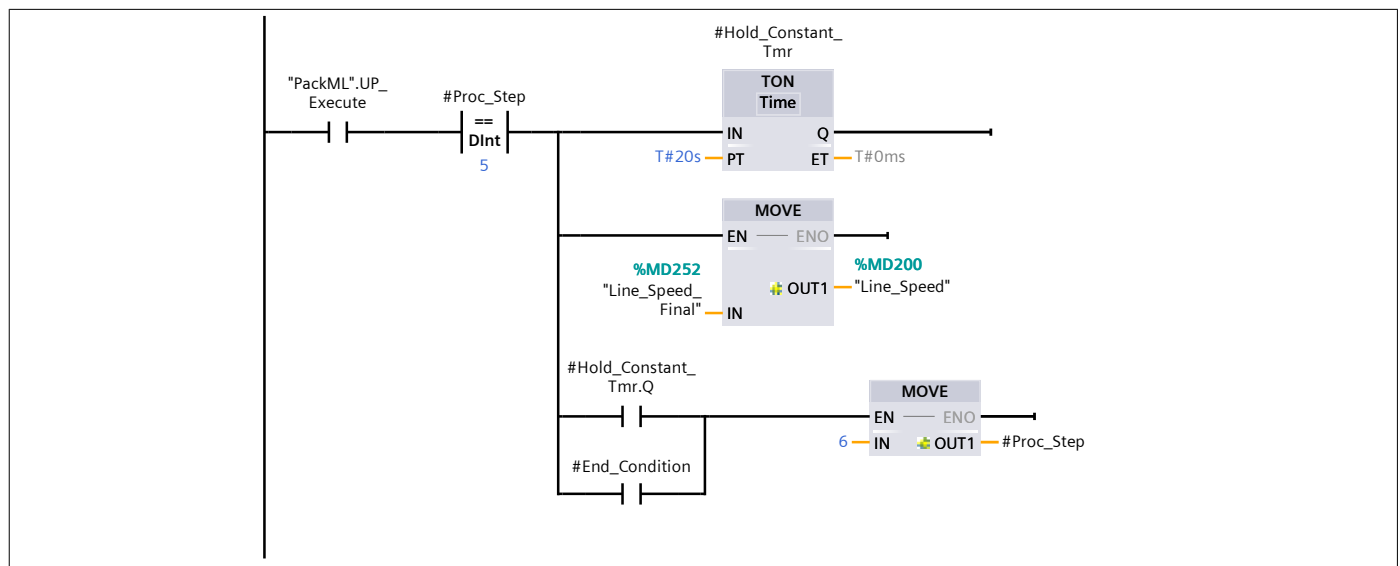
```

0001 IF #Proc_Step=4 THEN
0002     #Up_Preset_Time := #Ramp_Up_Tmr.PT;
0003     #Up_Elaps_Time := #Ramp_Up_Tmr.ET;
0004     "Line_Speed" := "Line_Speed_Initial" + ("Line_Speed_Final" - "Line_Speed_Initial") * (DINT_TO_REAL(#Up_Elaps_Time) / DINT_TO_REAL(#Up_Preset_Time));
0005 END_IF;
0006

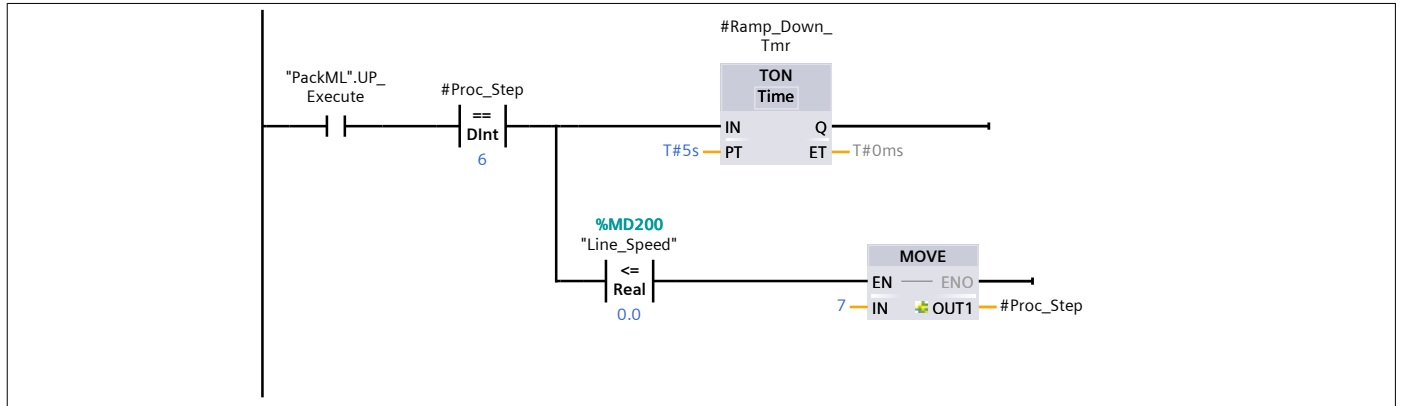
```

Network 11: Step 5 - Hold line speed constant

Until time expires or radius of source reel below minimum



Network 12: Step 6 - Ramp down to zero



Network 13: Calculate line speed as ramp

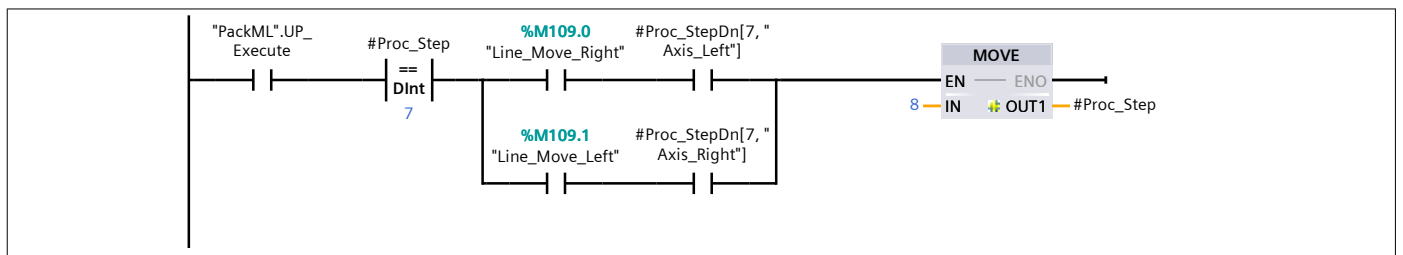
```

0001 IF #Proc_Step=6 THEN
0002     #Down_Preset_Time := #Ramp_Down_Tmr.PT;
0003     #Down_Elaps_Time := #Ramp_Down_Tmr.ET;
0004     "Line_Speed" := "Line_Speed_Final" * (DINT_TO_REAL(#Down_Pre-
set_Time) - DINT_TO_REAL(#Down_Elaps_Time)) / DINT_TO_REAL(#Down_Preset_Time);
0005     IF "Line_Speed" < 0.0 THEN
0006         "Line_Speed" := 0.0;
0007     END_IF;
0008 END_IF;
0009

```

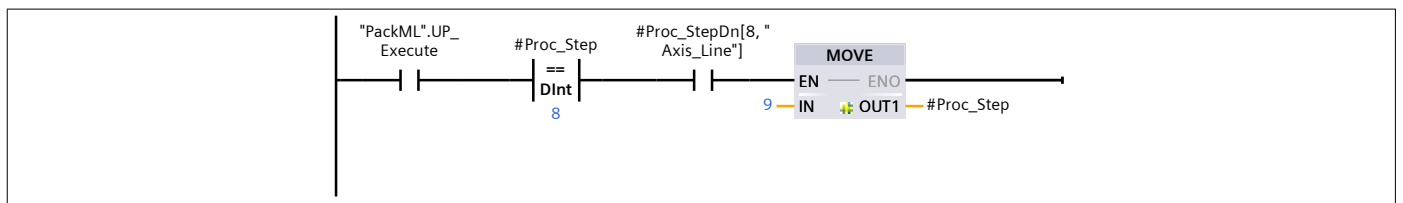
Network 14: Step 7 - Stop unwinder axis

Line moving right, stop the left axis. Moving left, stop the right axis



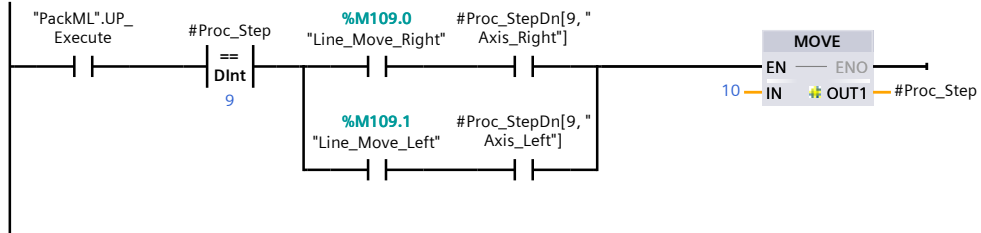
Network 15: Step 8 - Stop Line axis

Axis does not exist, so short the step complete indication from the axis

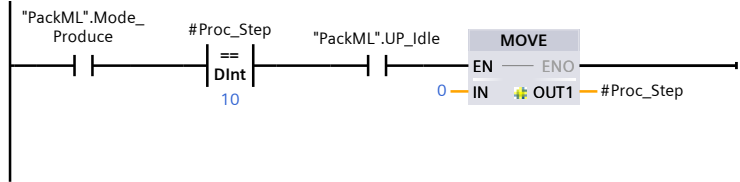


Network 16: Step 9 - Stop rewinder axis

Line moving right, stop the right axis. Moving left, stop the left axis



Network 17: Step 10 - Back to idle



Program blocks / 0_UN01_Winder

UN01_UP02_LaserDistance [FB102]

UN01_UP02_LaserDistance Properties

General

Name	UN01_UP02_LaserDis- tance	Number	102	Type	FB
Language	LAD	Numbering	Manual		

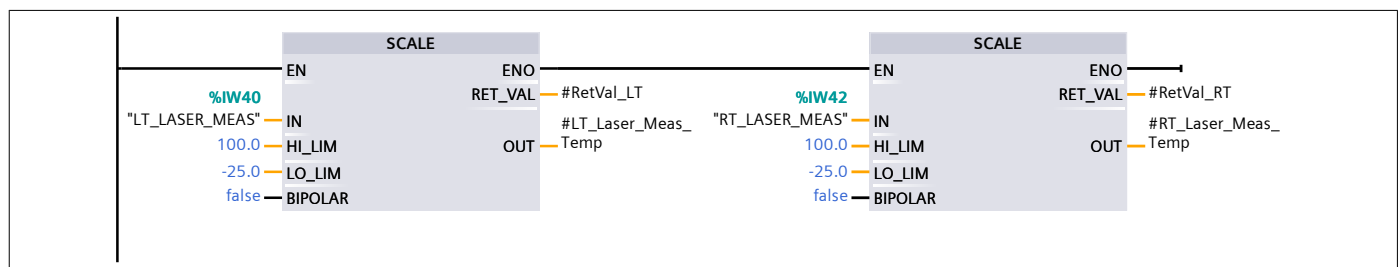
Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
RetVal_RT	Word	16#0	Non-retain
RetVal_LT	Word	16#0	Non-retain
LT_Laser_Meas_Temp	Real	0.0	Non-retain
RT_Laser_Meas_Temp	Real	0.0	Non-retain
Laser_Min_Measurement	Real	22.0	Non-retain
Laser_Max_Measurement	Real	27.5	Non-retain
Laser_Dist_Hysteresis	Real	0.05	Non-retain
LT_Laser_Dist_Meas_Last	Real	0.0	Non-retain
RT_Laser_Dist_Meas_Last	Real	0.0	Non-retain
LT_Laser_Dist_Filtered	Real	0.0	Non-retain
RT_Laser_Dist_Filtered	Real	0.0	Non-retain
Calc_Tmr	TON_TIME		Non-retain
Calc_Tmr_DN	Bool	false	Non-retain
Laser_Dist_Filter_Mult	Real	0.995	Non-retain
Temp			
Constant			

Network 1: Capture raw measurements

In units of percent



Network 2: Make sure laser measurements are not outside range of 22 to 27.5 percent, which is roughly 5 to 10.75 inches

```

0001 IF #LT_Laser_Meas_Temp < #Laser_Min_Measurement THEN
0002     #LT_Laser_Meas_Temp := #Laser_Min_Measurement;
0003 END_IF;
0004 IF #LT_Laser_Meas_Temp > #Laser_Max_Measurement THEN
0005     #LT_Laser_Meas_Temp := #Laser_Max_Measurement;
0006 END_IF;
0007 IF #RT_Laser_Meas_Temp < #Laser_Min_Measurement THEN
0008     #RT_Laser_Meas_Temp := #Laser_Min_Measurement;
0009 END_IF;
0010 IF #RT_Laser_Meas_Temp > #Laser_Max_Measurement THEN
0011     #RT_Laser_Meas_Temp := #Laser_Max_Measurement;
0012 END_IF;

```

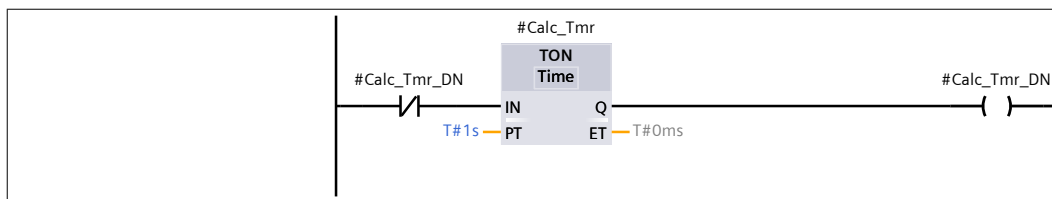
Network 3: Initialize laser measurement filter last value to current measurement value

```

0001 IF "First_Scan" THEN
0002     #LT_Laser_Dist_Meas_Last := #LT_Laser_Meas_Temp;
0003     #RT_Laser_Dist_Meas_Last := #RT_Laser_Meas_Temp;
0004 END_IF;

```

Network 4: Calculations done every 0.1 seconds



Network 5: Make sure laser measurements do not change more than a certain amount between samples.

The distance does not change that much.

```

0001 IF #LT_Laser_Meas_Temp > #LT_Laser_Dist_Meas_Last + #Laser_Dist_Hysteresis THEN
0002     #LT_Laser_Meas_Temp := #LT_Laser_Dist_Meas_Last + #Laser_Dist_Hysteresis;
0003 END_IF;
0004 IF #LT_Laser_Meas_Temp < #LT_Laser_Dist_Meas_Last - #Laser_Dist_Hysteresis THEN
0005     #LT_Laser_Meas_Temp := #LT_Laser_Dist_Meas_Last - #Laser_Dist_Hysteresis;
0006 END_IF;
0007 IF #RT_Laser_Meas_Temp > #RT_Laser_Dist_Meas_Last + #Laser_Dist_Hysteresis THEN
0008     #RT_Laser_Meas_Temp := #RT_Laser_Dist_Meas_Last + #Laser_Dist_Hysteresis;
0009 END_IF;
0010 IF #RT_Laser_Meas_Temp < #RT_Laser_Dist_Meas_Last - #Laser_Dist_Hysteresis THEN
0011     #RT_Laser_Meas_Temp := #RT_Laser_Dist_Meas_Last - #Laser_Dist_Hysteresis;
0012 END_IF;

```

Network 6: Filter left laser distance measurement

Also convert to mm

```

0001 IF #Calc_Tmr_DN THEN
0002     #LT_Laser_Dist_Filtered := #LT_Laser_Meas_Temp * (1.0 - #Laser_Dist_Fil-
        ter_Mult) + (#LT_Laser_Dist_Meas_Last * #Laser_Dist_Filter_Mult);
0003     #LT_Laser_Dist_Meas_Last := #LT_Laser_Meas_Temp;
0004 END_IF;
0005 "Left_Laser_Dist" := (#LT_Laser_Dist_Filtered / 100.0) * 1000.0;

```

Network 7: Filter right laser distance measurement

Also convert to mm

```

0001 IF #Calc_Tmr_DN THEN
0002     #RT_Laser_Dist_Filtered := #RT_Laser_Meas_Temp * (1.0 - #Laser_Dist_Fil-
        ter_Mult) + (#RT_Laser_Dist_Meas_Last * #Laser_Dist_Filter_Mult);
0003     #RT_Laser_Dist_Meas_Last := #RT_Laser_Meas_Temp;
0004 END_IF;
0005 "Right_Laser_Dist" := (#RT_Laser_Dist_Filtered / 100.0) * 1000.0;

```

Network 8: Calculate reel radii

```

0001 "Left_Roll_Radius" := "Left_Laser_Dist_ToReelCenter" - "Left_Laser_Dist";
0002 "Right_Roll_Radius" := "Right_Laser_Dist_ToReelCenter" - "Right_Laser_Dist";

```


Program blocks / EM01_Axis_Left

EM01_00_Main [FB200]

EM01_00_Main Properties

General

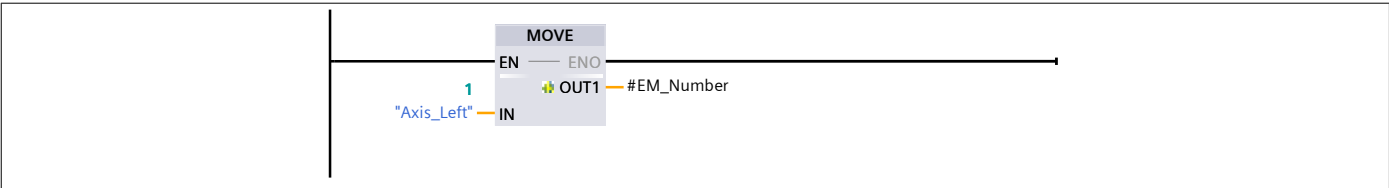
Name	EM01_00_Main	Number	200	Type	FB
Language	LAD	Numbering	Manual		

Information

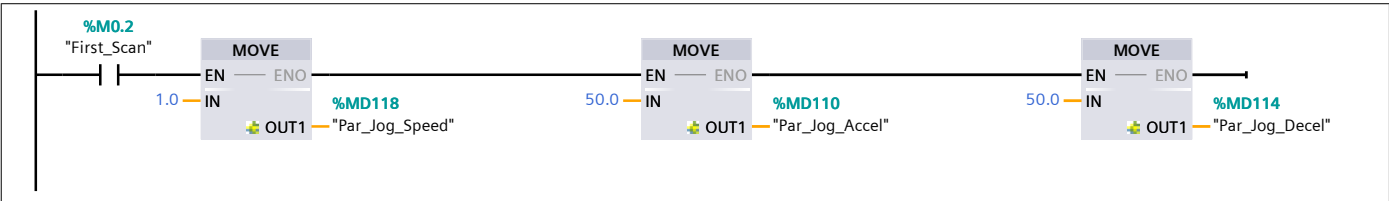
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	Non-retain
Wrk_NoStepsActive	Bool	false	Non-retain
Wrk_MotionStepsError	Bool	false	Non-retain
Wrk_JogFault	Bool	false	Non-retain
CM00_Procedure	"EM01_CM00_Procedure"		
CM02_ServoAxisObject	"EM01_CM02_ServoAxisObject"		
CM03_ServoAxisJog	"EM01_CM03_ServoAxisJog"		
Temp			
Constant			

Network 1:

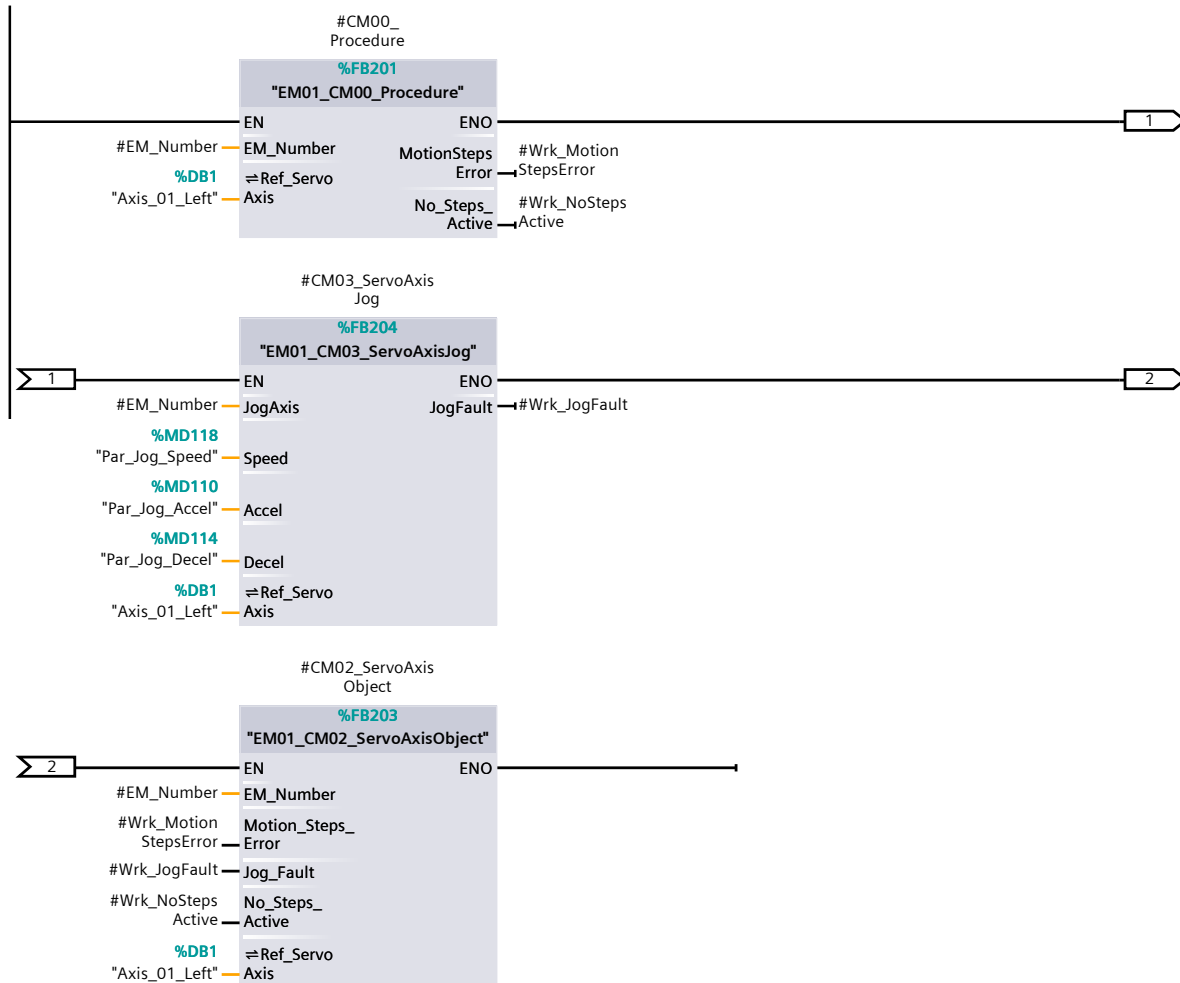


Network 2:



Network 3: Call other function blocks

Servo axis, procedure and jogging



Program blocks / EM01_Axis_Left

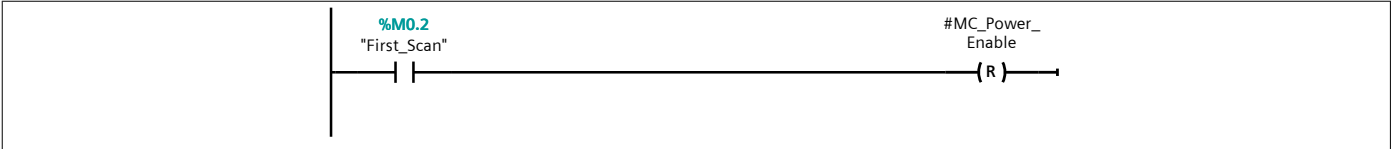
EM01_CM02_ServoAxisObject [FB203]

EM01_CM02_ServoAxisObject Properties					
General					
Name	EM01_CM02_ServoAxisObject	Number	203	Type	FB
Language	LAD	Numbering	Manual		
Information					
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
Motion_Steps_Error	Bool	false	Non-retain
Jog_Fault	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
Output			
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
MC_Power_Enable	Bool	false	Retain
Wrk_Home_Start	Bool	false	Non-retain
Wrk_MC_Power	MC_POWER		
Wrk_MC_Halt	MC_HALT		
Wrk_MC_Reset	MC_RESET		
Wrk_MC_Reset2	MC_RESET		
Wrk_Dummy_Home	Bool	false	Non-retain
Reset_Tmr	IEC_TIMER		Non-retain
Wrk_MC_Power_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset2_Err_Trans	Bool	false	Non-retain
Ref_ServoAxis_Err_Trans	Bool	false	Non-retain
Temp			
Constant			

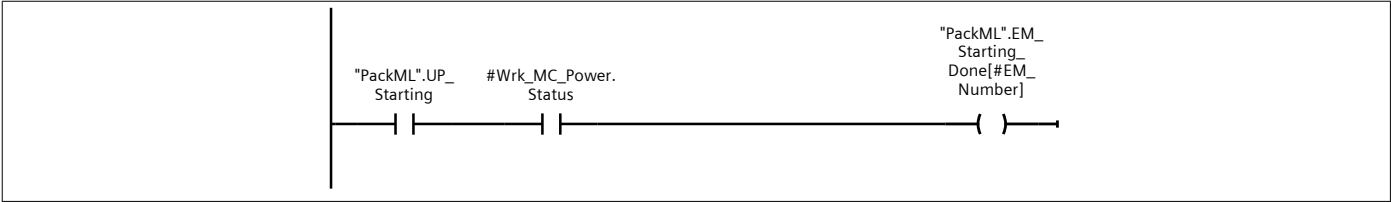
Network 1: First scan initialization

Reset power enable

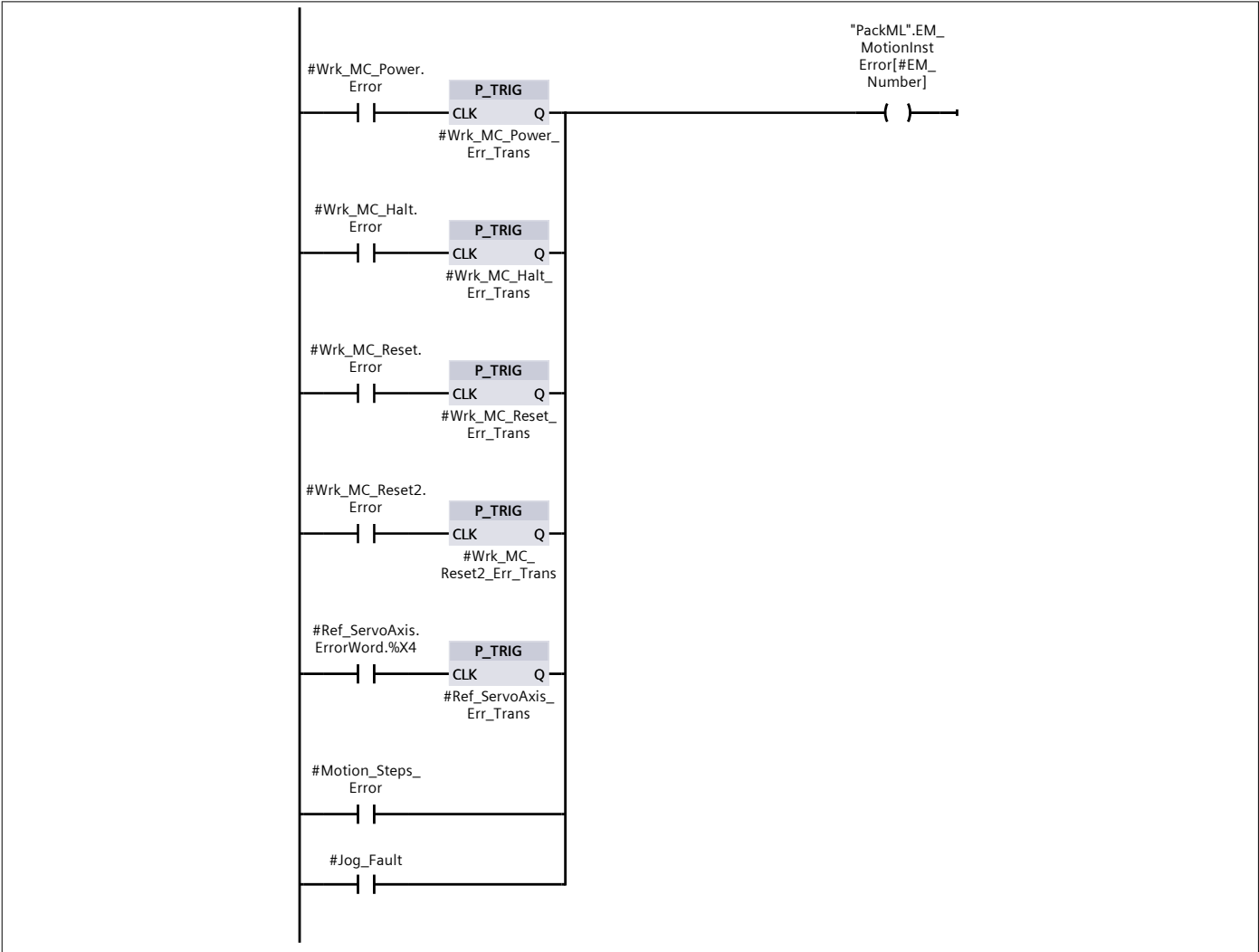


Network 2: State completion for STARTING

Starting - Check of power status is probably not absolutely necessary. Other starting tasks, such as gearing, could go here.

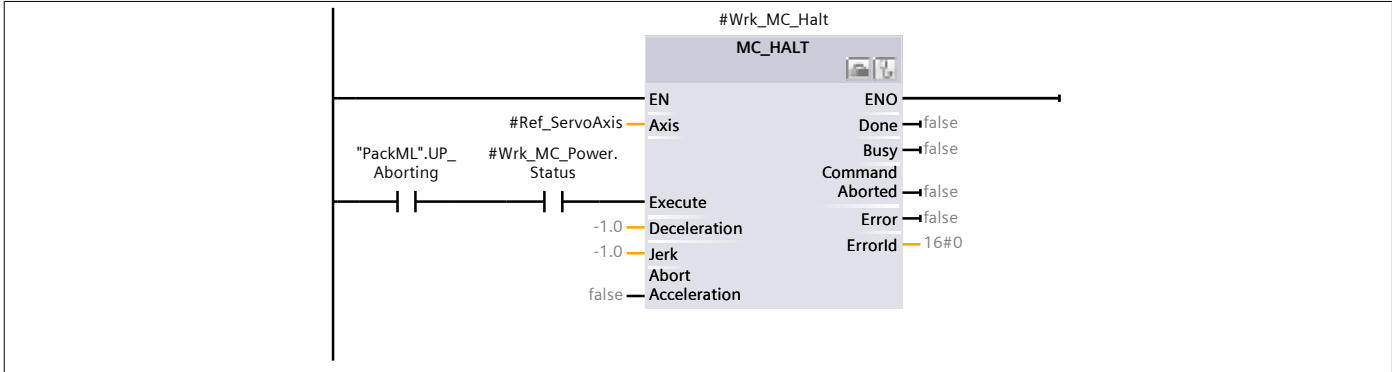


Network 3: Handle errors from motion blocks



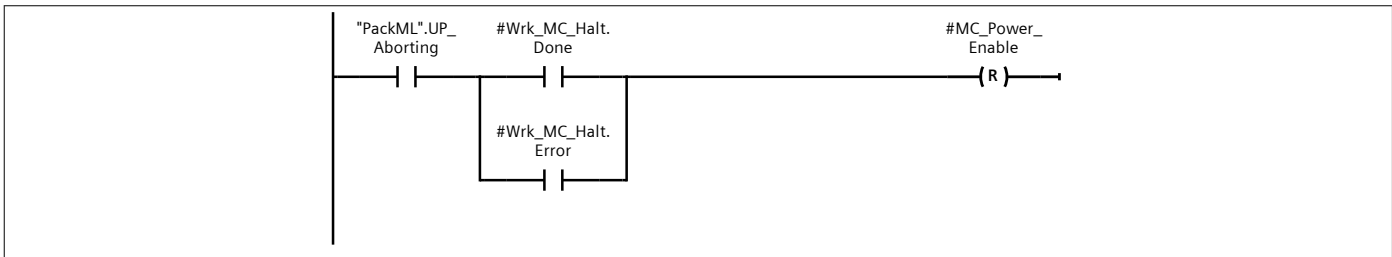
Network 4: MC_Halt block

If axis power not on, if do halt will generate unnecessary error



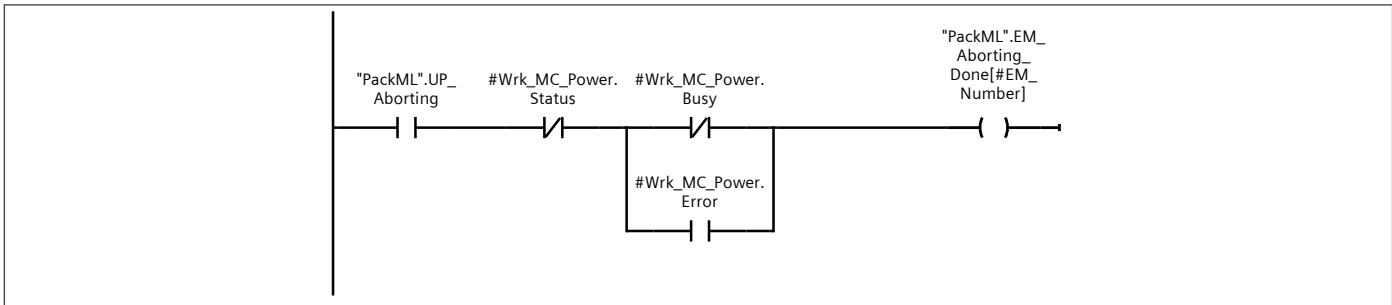
Network 5: Reset MC_Power enable as part of aborting

Resetting Enable input to MC_Power disables axis.



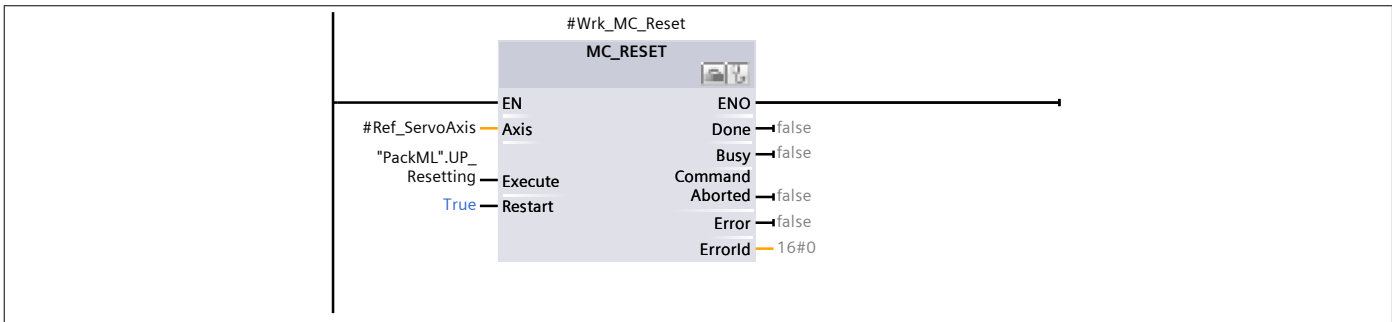
Network 6: State completion for ABORTING

Wait for status to be off before transitioning to next step.



Network 7: RESETTING - MC_Reset block

RESETTING - first reset any errors and faults

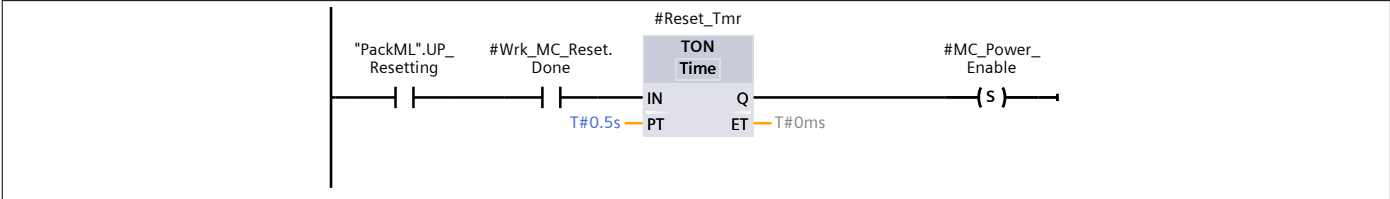


Network 8: RESETTING - Set MC_Power enable input

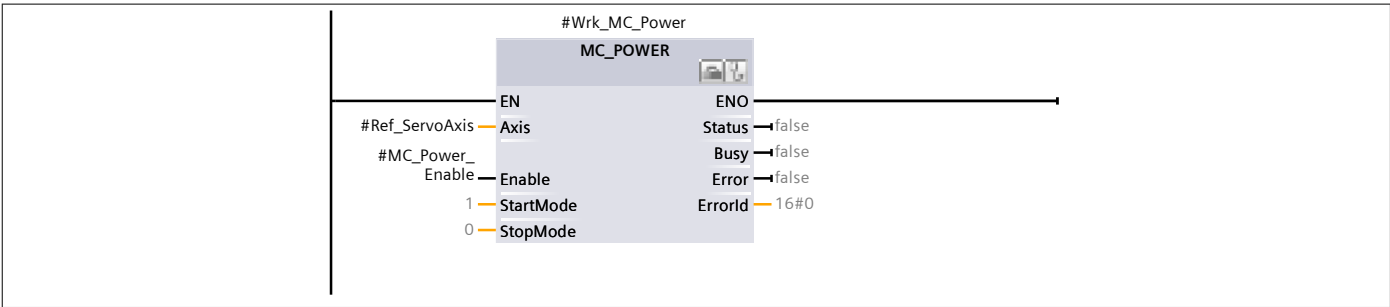
RESETTING -

When faults reset, wait 1/2 sec before setting Enable input of MC_Power. Wait for status
Next state is IDLE

Timer seems to be necessary. If no delay, MC_Power faults

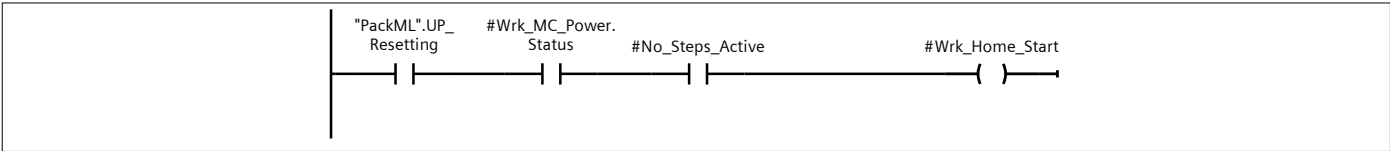


Network 9: RESETTING - MC_Power for axis



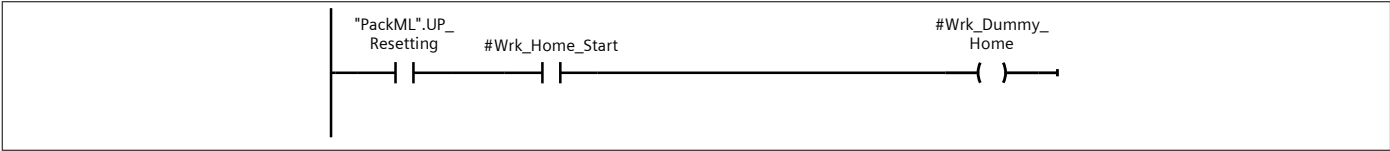
Network 10: RESETTING - ready for homing

RESETTING - Power status good and steps from motion steps are all off.

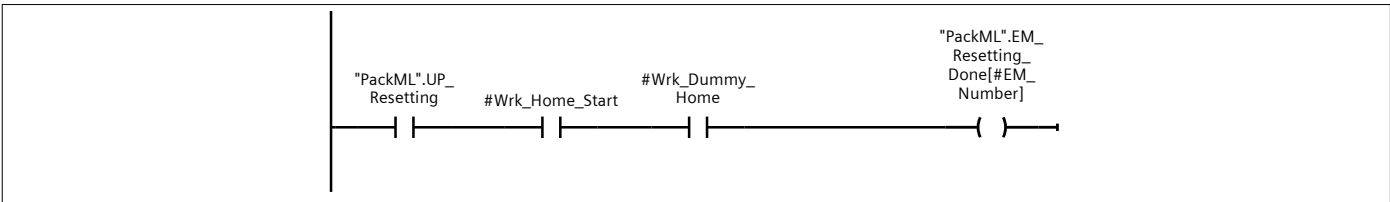


Network 11: Handle homing

Homing not valid for this system, so no call to EM01_CM04_ServoAxisHome FB

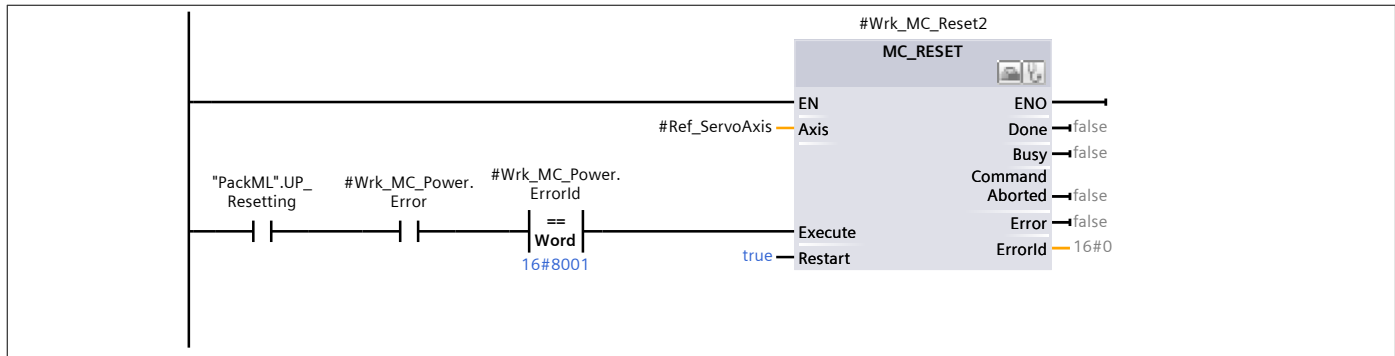


Network 12: RESETTING - state completion when homed

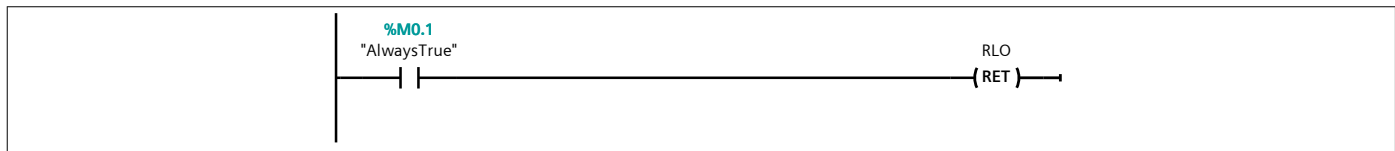


Network 13: Handle technology alarm from MC_Power

If the error is a technology alarm when resetting, clear the error in an attempt to let the MC_Power complete



Network 14: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM01_Axis_Left

EM01_CM03_ServoAxisJog [FB204]

EM01_CM03_ServoAxisJog Properties

General

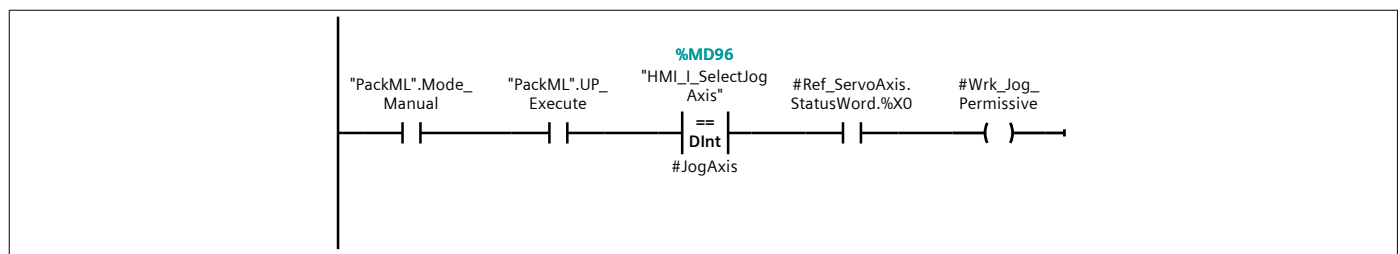
Name	EM01_CM03_ServoAxis-Jog	Number	204	Type	FB
Language	LAD	Numbering	Manual		

Information

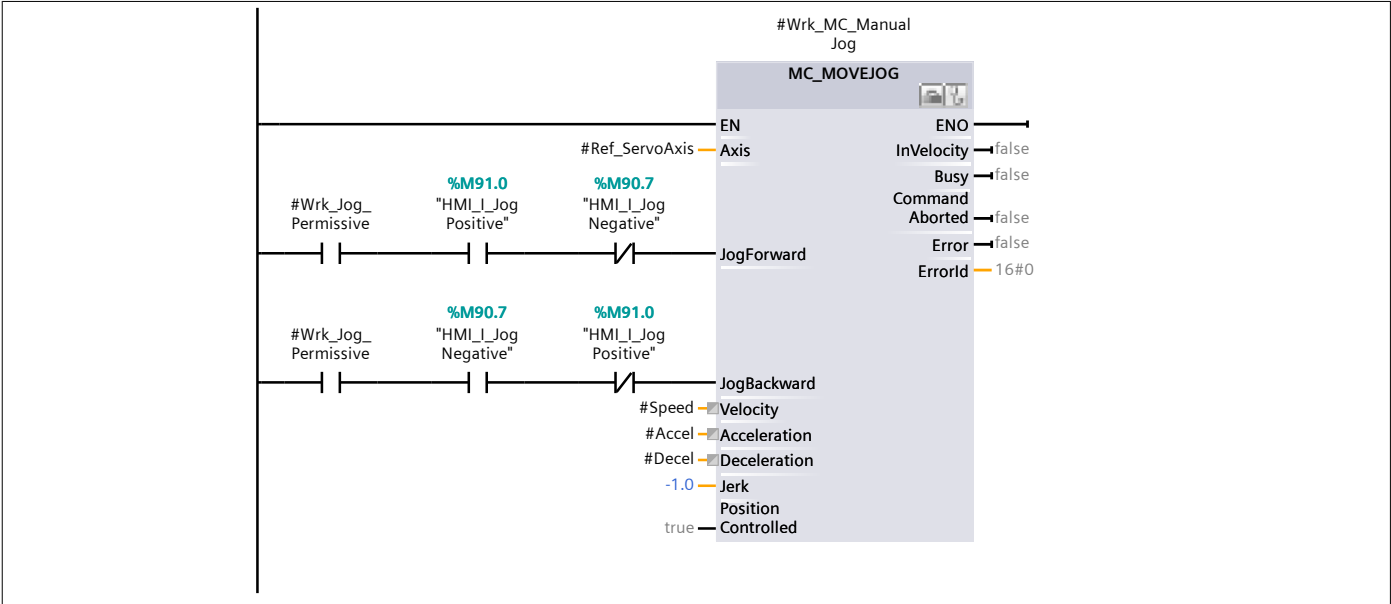
Title	Jog servo axis in manual mode	Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
JogAxis	DInt	0	Non-retain
Speed	Real	0.0	Non-retain
Accel	Real	0.0	Non-retain
Decel	Real	0.0	Non-retain
▼ Output			
JogFault	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
Wrk_Jog_Permissive	Bool	false	Non-retain
Wrk_MC_ManualJog	MC_MOVEJOG		
Temp			
Constant			

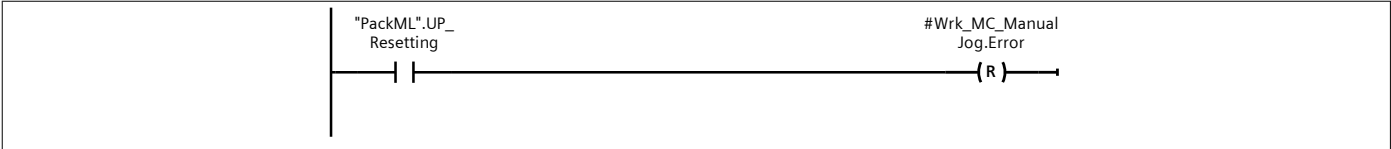
Network 1: Release jog function (-> Select EM number via HMI)



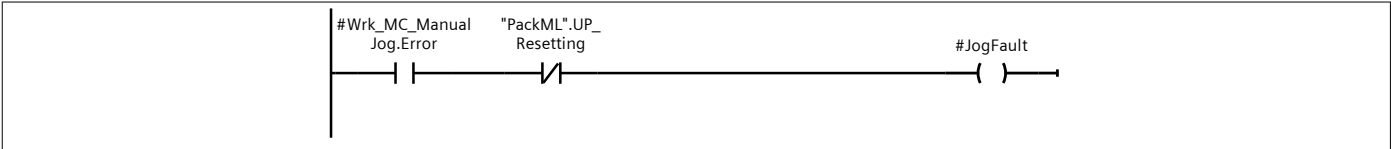
Network 2: Jog Servo Axis



Network 3: Fault Reset



Network 4:



Network 5: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM01_Axis_Left

EM01 [DB200]

EM01 Properties

General

Name	EM01	Number	200	Type	DB
Language	DB	Numbering	Manual		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	False
Wrk_NoStepsActive	Bool	false	False
Wrk_MotionStepsError	Bool	false	False
Wrk_JogFault	Bool	false	False
CM00_Procedure	"EM01_CM00_Procedure"		False
CM02_ServoAxisObject	"EM01_CM02_ServoAxisObject"		False
CM03_ServoAxisJog	"EM01_CM03_ServoAxisJog"		False

Program blocks / EM01_Axis_Left

EM01_CM00_Procedure [FB201]

EM01_CM00_Procedure Properties

General

Name	EM01_CM00_Procedure	Number	201	Type	FB
Language	LAD	Numbering	Manual		

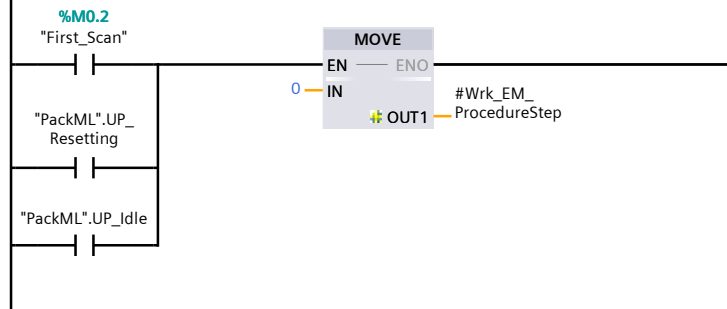
Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
▼ Output			
MotionStepsError	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
Wrk_MC_MoveVel	MC_MOVEVELOCITY		
Wrk_MC_MotionInVelocity	MC_MOTIONINVELOCITY		
Wrk_MC_Halt	MC_HALT		
Axis_Speed	Real	0.0	Non-retain
Do_Torque_Limit	Bool	false	Non-retain
Torque_Limit_Calc	Real	0.0	Non-retain
Axis_Speed_Temp	Real	0.0	Non-retain
Motion_InVelocity_Enable	Bool	false	Non-retain
Wrk_MC_MoveVel_Err_Trans	Bool	false	Non-retain
Wrk_MC_MotionInVelocity_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqueLimit_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqLimit	MC_TORQUELIMITING		
Start_Move	Bool	false	Non-retain
Wrk_EM_ProcedureNoStepsActive	Bool	false	Non-retain
Wrk_EM_ProcedureStep	DInt	0	Non-retain
Temp			
Constant			

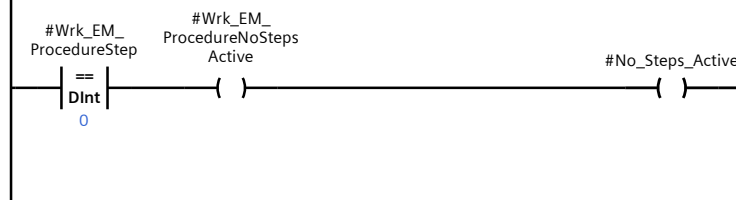
Network 1: Reset of all steps

First scan or resetting or idle - clear all steps

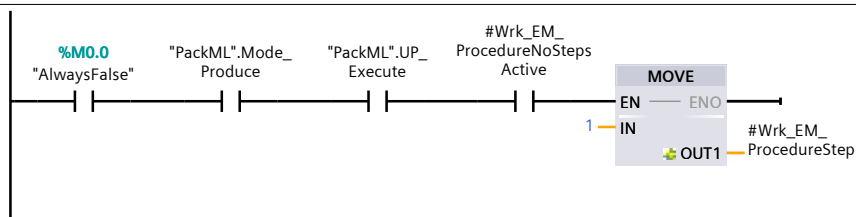


Network 2: Indication that all steps reset

Used by RESETTING state and initial execute step



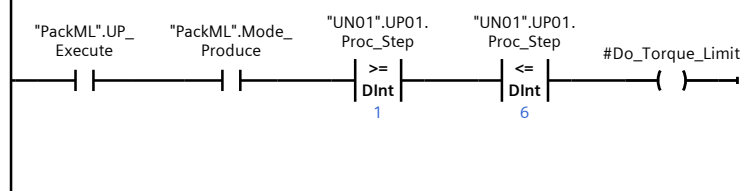
Network 3: Never start this procedure's steps



Network 4:

```
0001 IF "Line_Tension_Desired" <= 0.0 THEN
0002     "Line_Tension_Desired" := 1.0;
0003 END_IF;
```

Network 5: Steps where torque is limited



Network 6: Toque limit calculation and setting

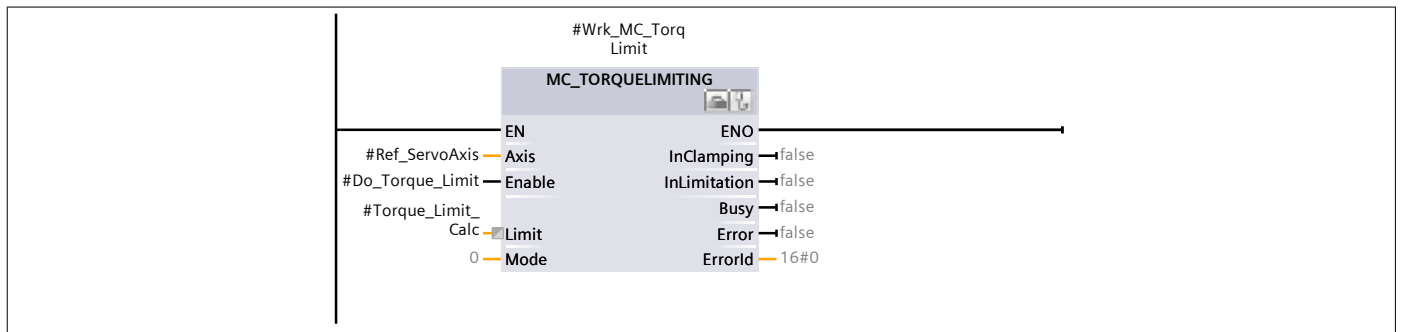
Toque in Nm, not percent of max

```

0001 IF #Do_Torque_Limit THEN
0002     #Torque_Limit_Calc := "Line_Tension_Desired" * ("Left_Roll_Radius" / 1000.0);
0003     IF "Line_Move_Left" THEN
0004         #Torque_Limit_Calc := #Torque_Limit_Calc + "Additional_Torque";
0005     END_IF;
0006     IF #Torque_Limit_Calc > "Motor_Torque_Max" THEN
0007         #Torque_Limit_Calc := "Motor_Torque_Max";
0008     END_IF;
0009 ELSE
0010     #Torque_Limit_Calc := "Motor_Torque_Max";
0011 END_IF;
0012 "Takeup_Torque_Limit" := #Torque_Limit_Calc;
0013

```

Network 7:

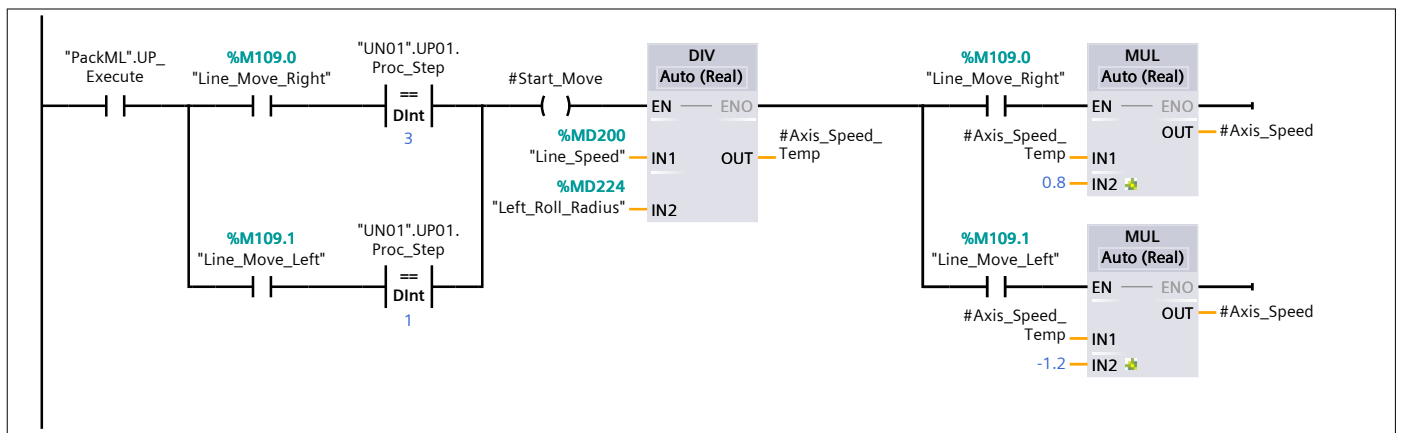


Network 8: UP Procedure Step 1 or 3 - set direction and axis speed

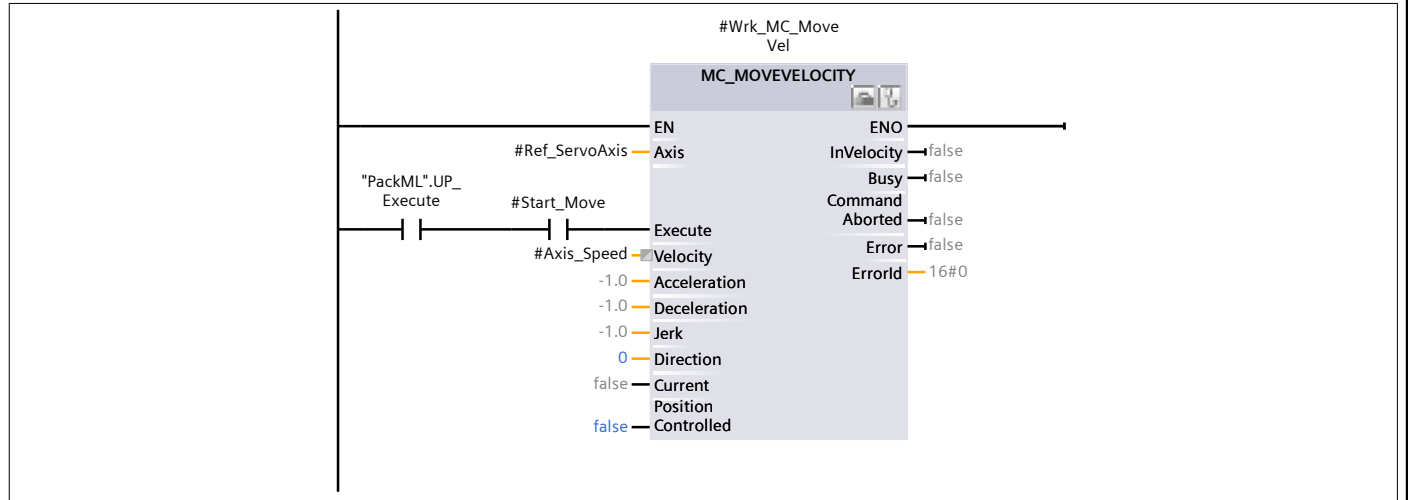
Speed in radians/sec

If rewinding (move left), set speed 50% higher than normal to provide tension

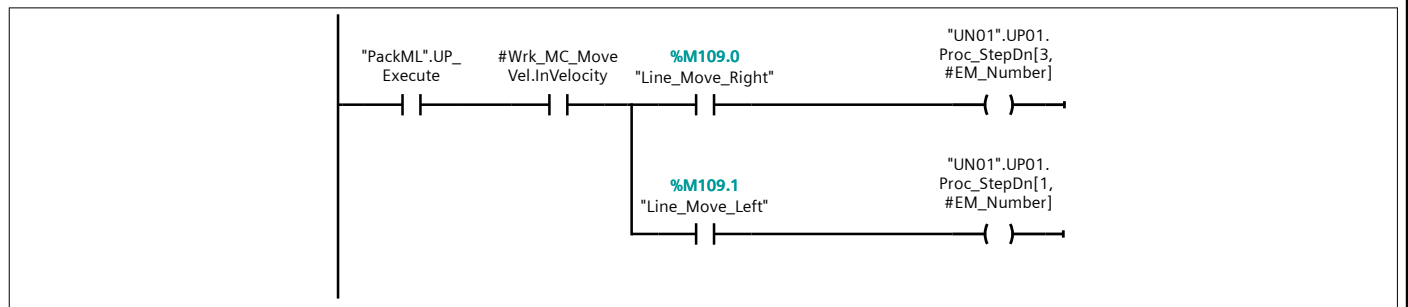
If unwinding (move right), set speed 50% lower than normal



Network 9: UP Procedure Step 1 or 3 - start this axis based on the lne speed

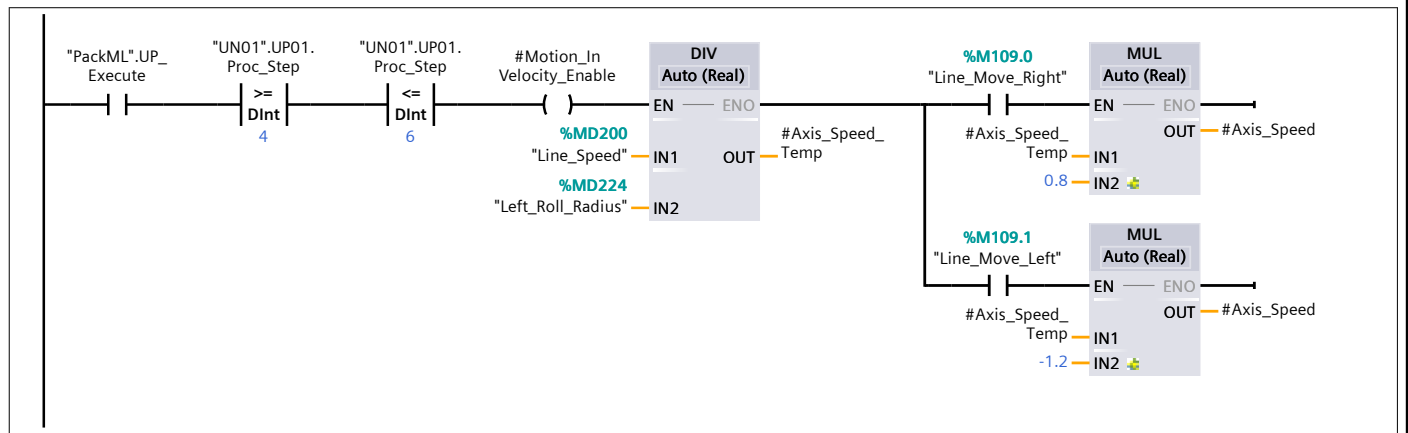


Network 10: UP Procedure Step 1 or 3 transition - axis started when at velocity

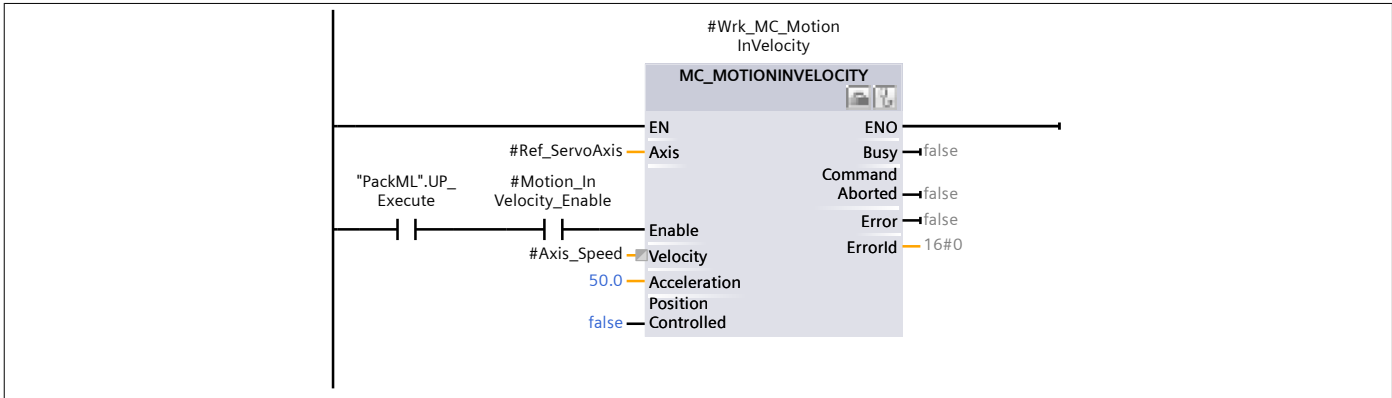


Network 11: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and reel radius

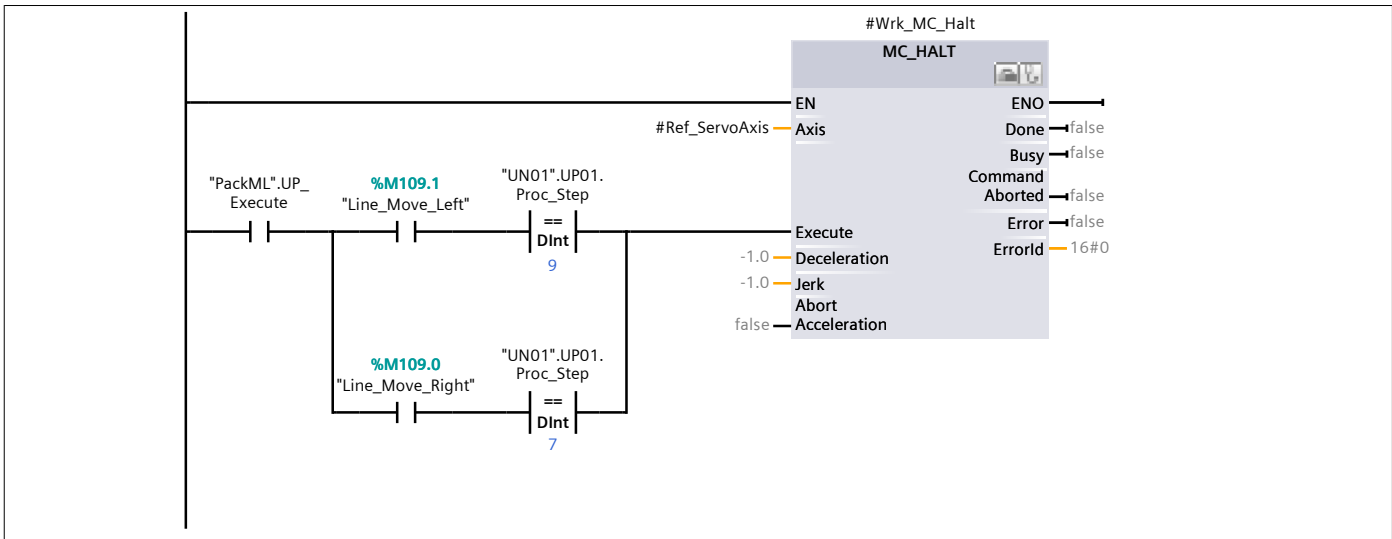
If unwinder, speed must be negative.



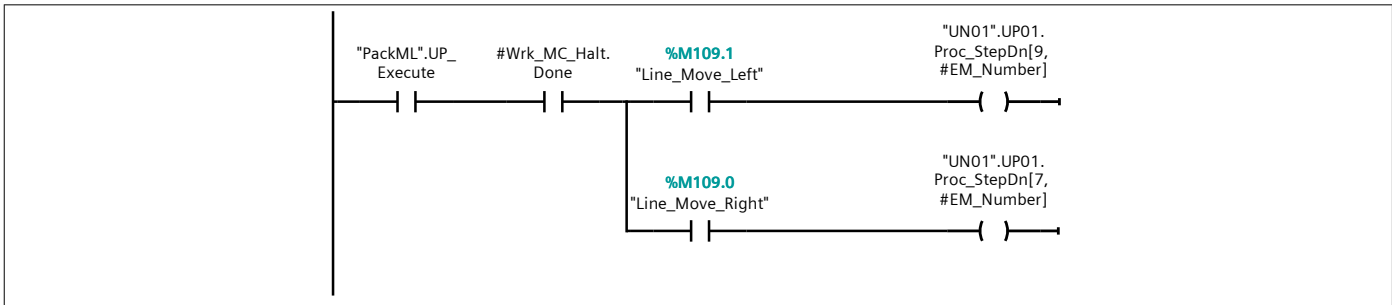
Network 12: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and reel radius



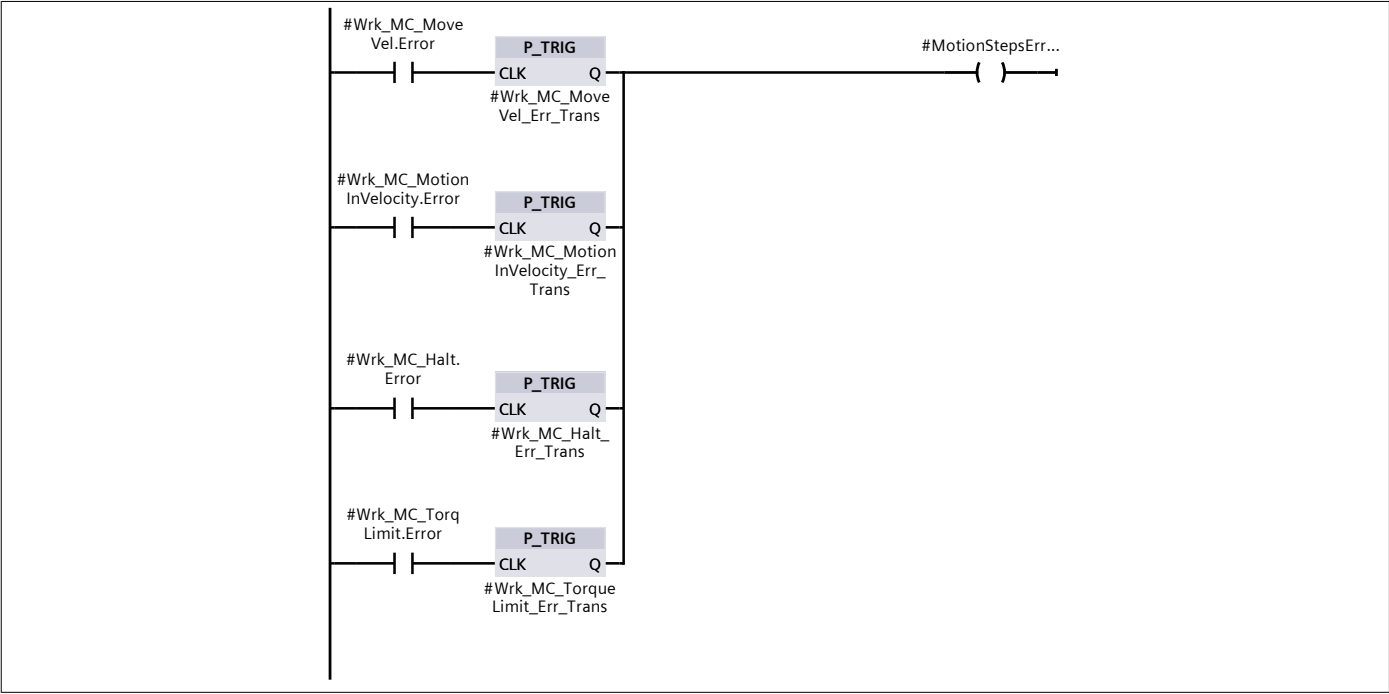
Network 13: UP Procedure Steps 7 or 9 - Stop axis



Network 14: UP Procedure Step 7 or 9 transition - axis stopped



Network 15: Copy motion block errors to axis error flag



Network 16: Speed, torque of axis.

```
0001 "Left_Roll_Speed" := "Axis_01_Left".ActualVelocity;  
0002 "Left_Roll_Torque" := "Axis_01_Left".StatusTorqueData.ActualTorque;  
0003
```

Network 17: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks

MiscBlocks

This folder is empty.

Program blocks / EM02_Axis_Line

EM02_00_Main [FB300]

EM02_00_Main Properties

General

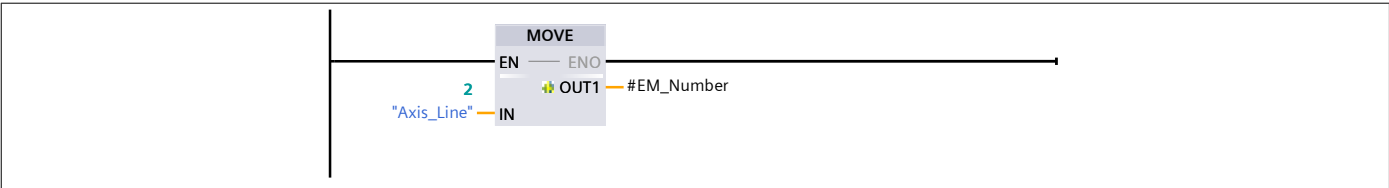
Name	EM02_00_Main	Number	300	Type	FB
Language	LAD	Numbering	Manual		

Information

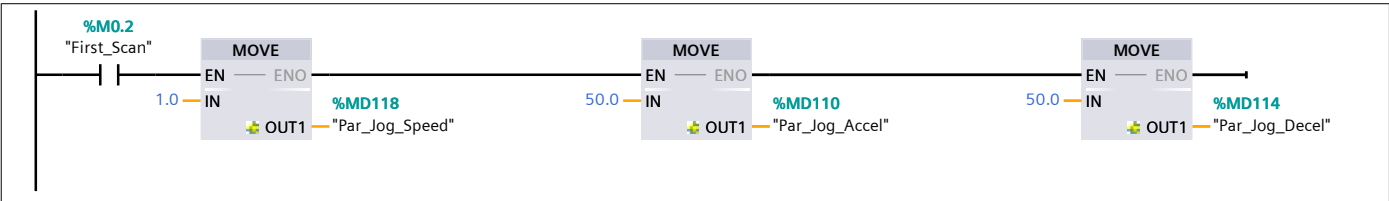
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	Non-retain
Wrk_NoStepsActive	Bool	false	Non-retain
Wrk_MotionStepsError	Bool	false	Non-retain
Wrk_JogFault	Bool	false	Non-retain
CM00_Procedure	"EM02_CM00_Procedure"		
CM02_ServoAxisObject	"EM02_CM02_ServoAxisObject"		
CM03_ServoAxisJog	"EM02_CM03_ServoAxisJog"		
Temp			
Constant			

Network 1:

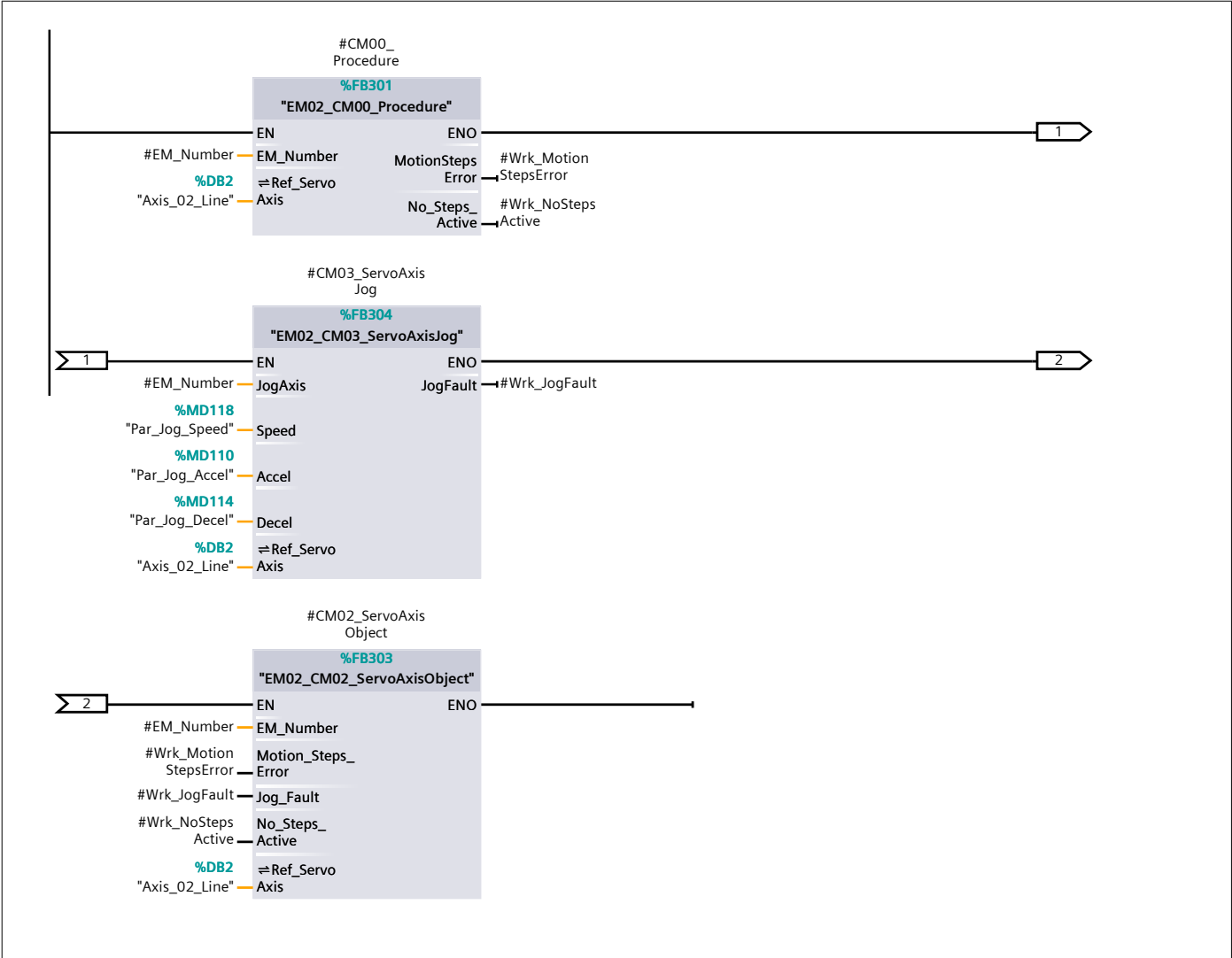


Network 2:



Network 3: Call other function blocks

Servo axis, procedure and jogging



Program blocks / EM02_Axis_Line

EM02_CM00_Procedure [FB301]

EM02_CM00_Procedure Properties

General

Name	EM02_CM00_Procedure	Number	301	Type	FB
Language	LAD	Numbering	Manual		

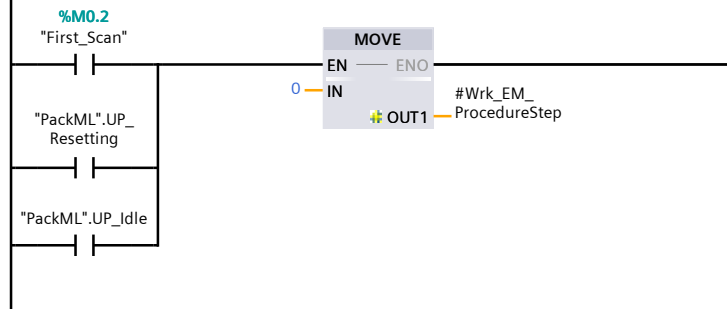
Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
▼ Output			
MotionStepsError	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
Wrk_MC_MoveVel	MC_MOVEVELOCITY		
Wrk_MC_MotionInVelocity	MC_MOTIONINVELOCITY		
Wrk_MC_Halt	MC_HALT		
Axis_Speed	Real	0.0	Non-retain
Do_Torque_Limit	Bool	false	Non-retain
Torque_Limit_Calc	Real	0.0	Non-retain
Axis_Speed_Temp	Real	0.0	Non-retain
Motion_InVelocity_Enable	Bool	false	Non-retain
Wrk_MC_MoveVel_Err_Trans	Bool	false	Non-retain
Wrk_MC_MotionInVelocity_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqueLimit_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqLimit	MC_TORQUELIMITING		
Start_Move	Bool	false	Non-retain
Wrk_EM_ProcedureNoStepsActive	Bool	false	Non-retain
Wrk_EM_ProcedureStep	DInt	0	Non-retain
Temp			
Constant			

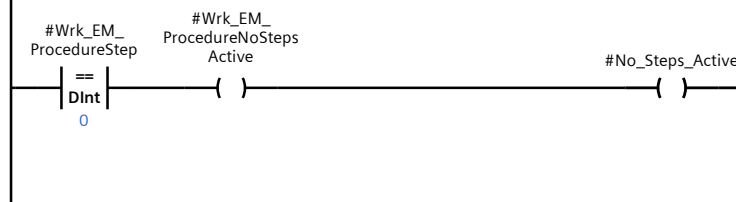
Network 1: Reset of all steps

First scan or resetting or idle - clear all steps

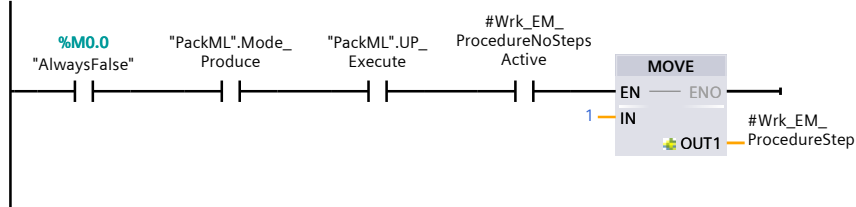


Network 2: Indication that all steps reset

Used by RESETTNG state and initial execute step



Network 3: Never start this procedure's steps

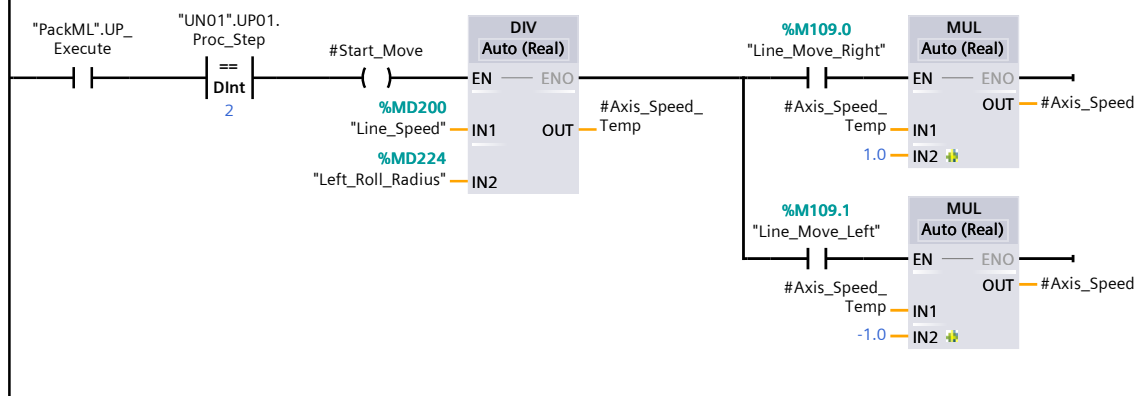


Network 4: UP Procedure Step 2 - uses left roll radius to set speed

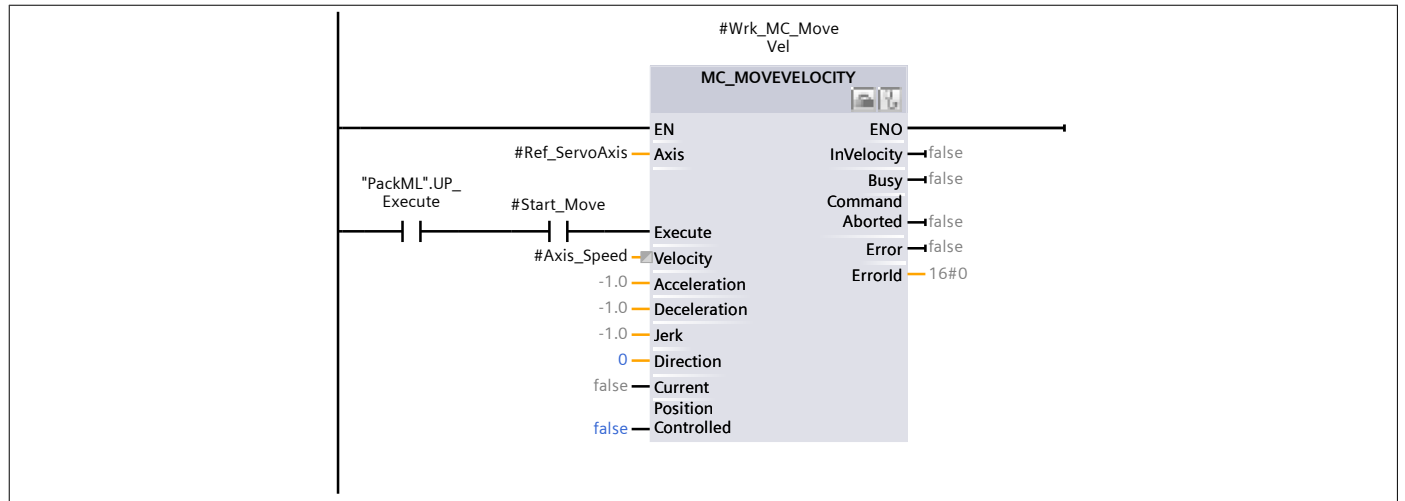
Speed in radians/sec

If rewinding (move left), set speed 50% higher than normal to provide tension

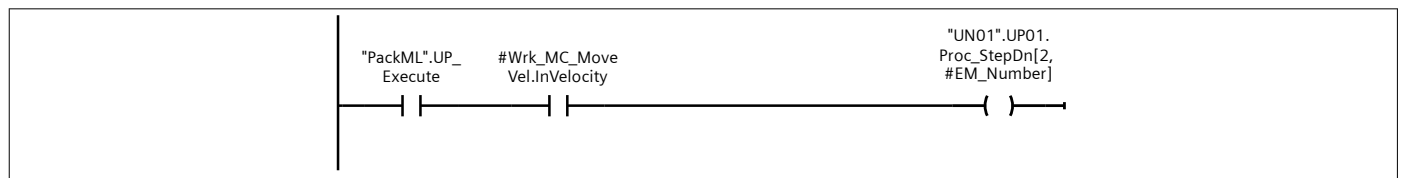
If unwinding (move right), set speed 50% lower than normal



Network 5: UP Procedure Step 1 or 3 - start this axis based on the lne speed

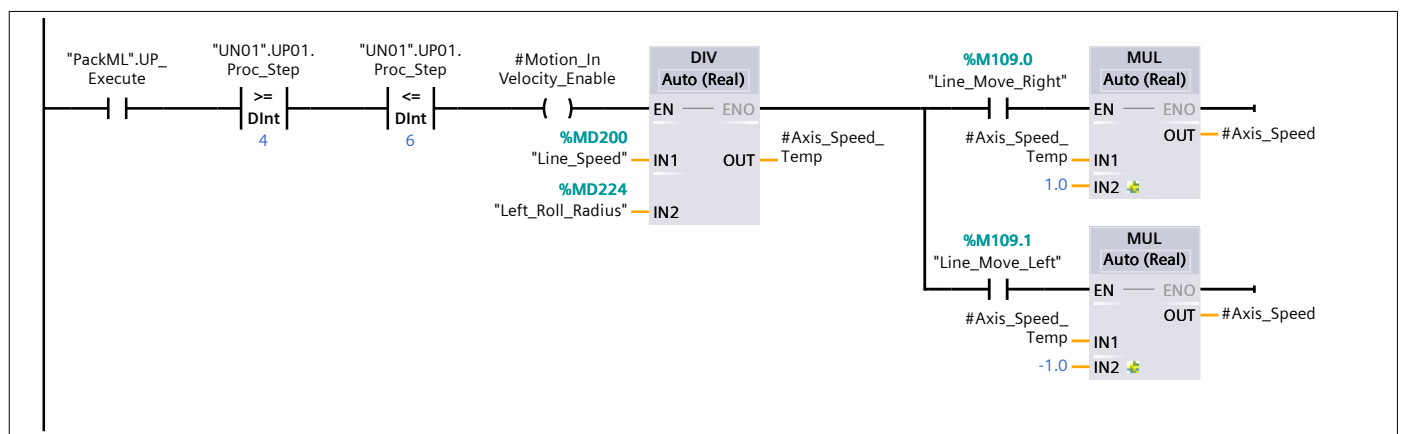


Network 6: UP Procedure Step 1 or 3 transition - axis started when at velocity

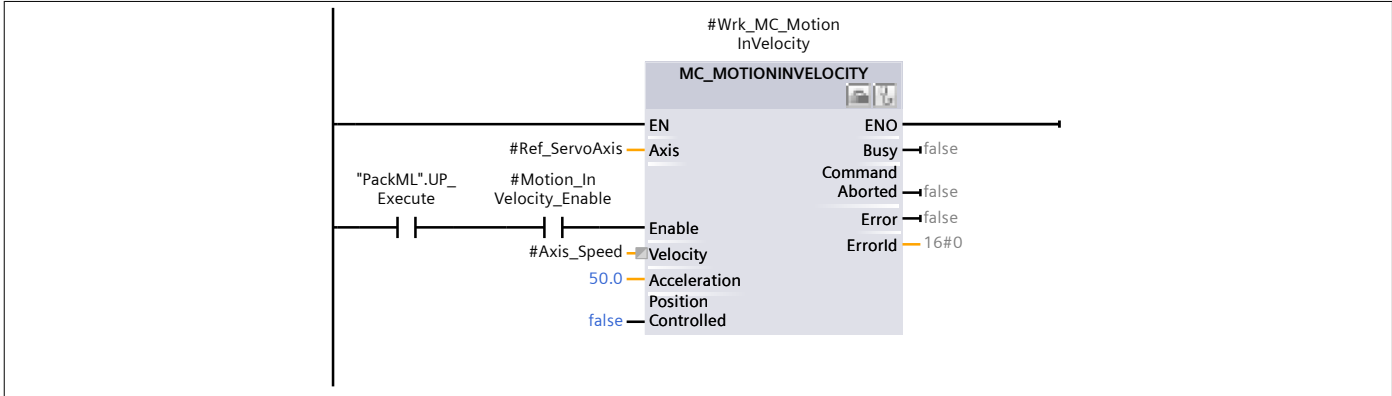


Network 7: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and left roll radius

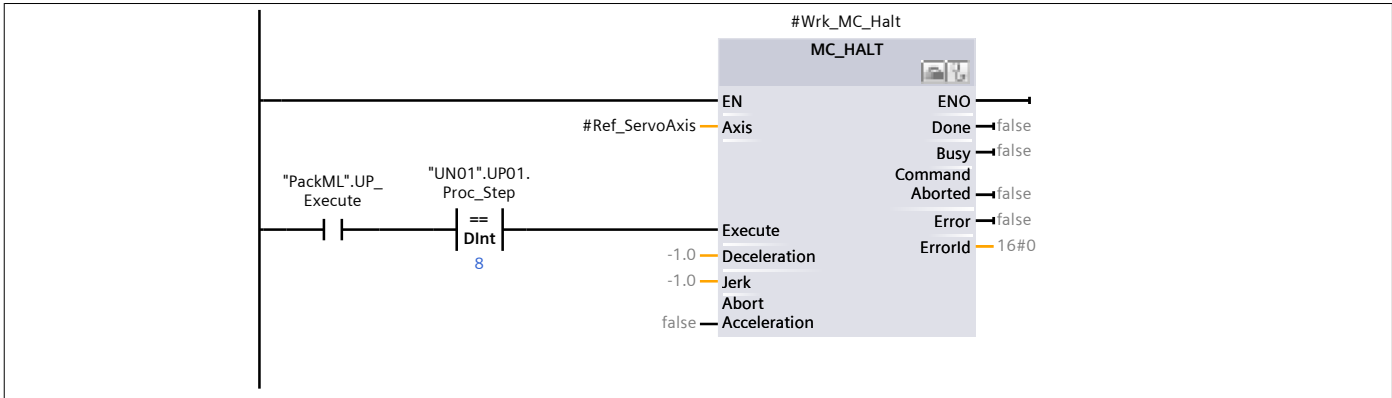
If unwinder, speed must be negative.



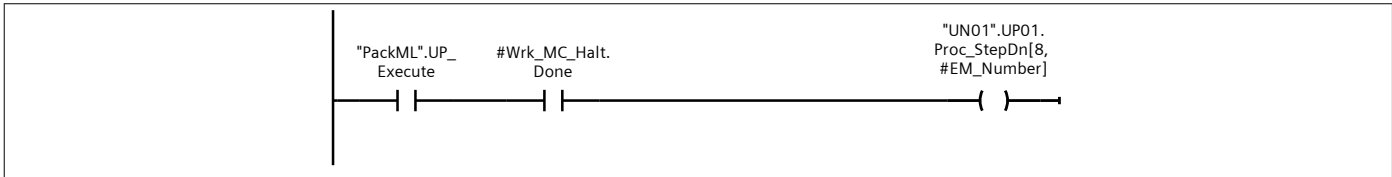
Network 8: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and reel radius



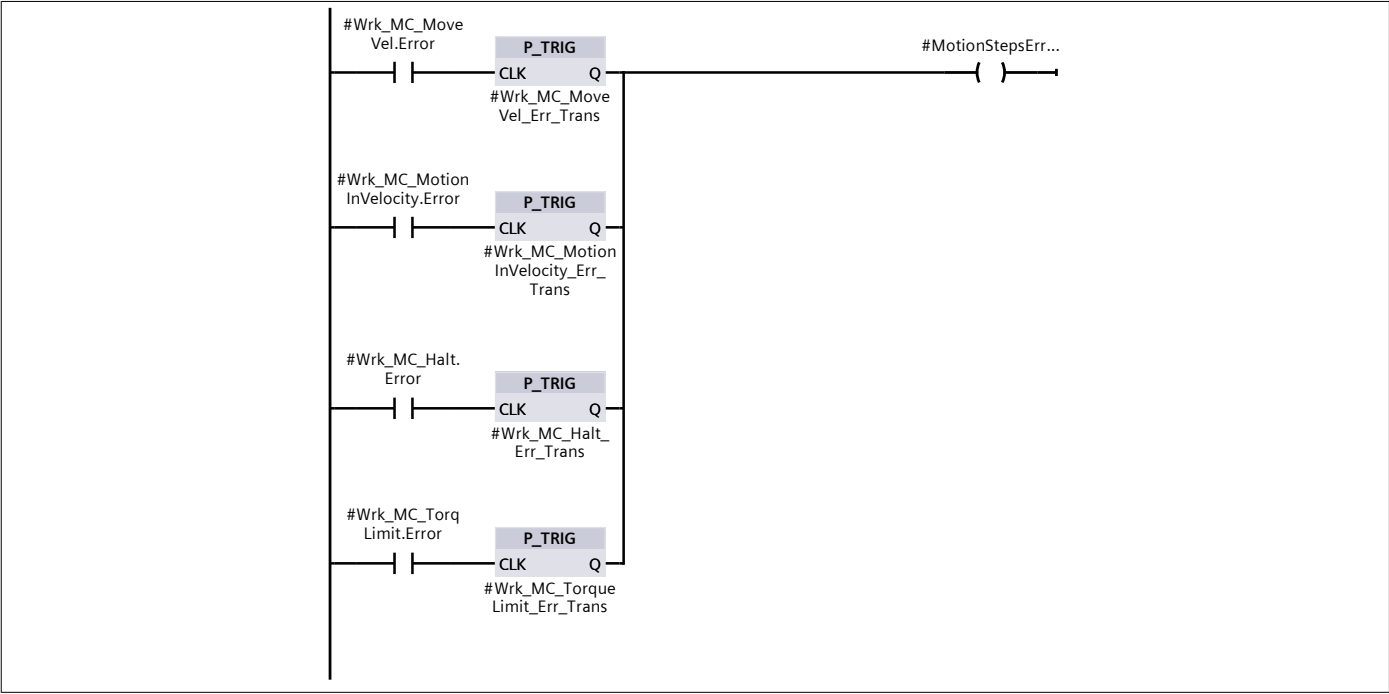
Network 9: UP Procedure Step 8 - Stop axis



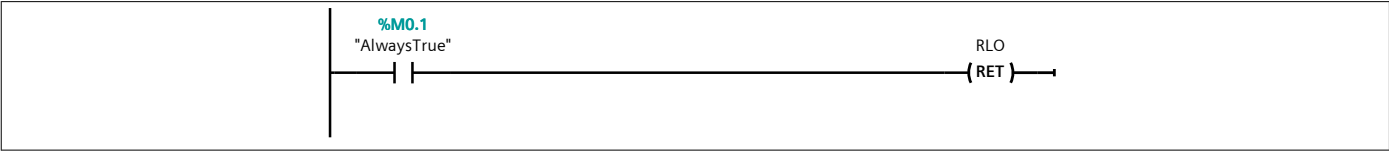
Network 10: UP Procedure Step 8 transition - axis stopped



Network 11: Copy motion block errors to axis error flag



Network 12: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM02_Axis_Line

EM02_CM02_ServoAxisObject [FB303]

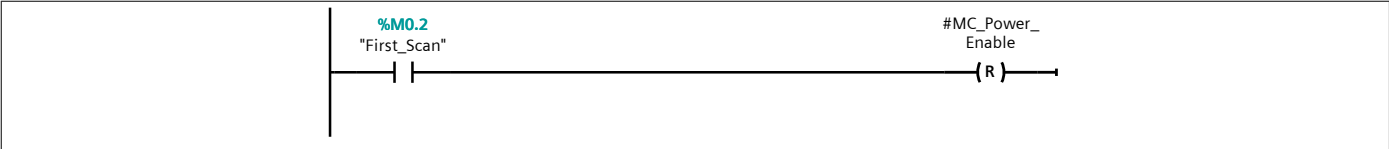
EM02_CM02_ServoAxisObject Properties

General					
Name	EM02_CM02_ServoAxisObject	Number	303	Type	FB
Language	LAD	Numbering	Manual		
Information					
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
Motion_Steps_Error	Bool	false	Non-retain
Jog_Fault	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
Output			
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
MC_Power_Enable	Bool	false	Retain
Wrk_Home_Start	Bool	false	Non-retain
Wrk_MC_Power	MC_POWER		
Wrk_MC_Halt	MC_HALT		
Wrk_MC_Reset	MC_RESET		
Wrk_MC_Reset2	MC_RESET		
Wrk_Dummy_Home	Bool	false	Non-retain
Reset_Tmr	IEC_TIMER		Non-retain
Wrk_MC_Power_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset2_Err_Trans	Bool	false	Non-retain
Ref_ServoAxis_Err_Trans	Bool	false	Non-retain
Temp			
Constant			

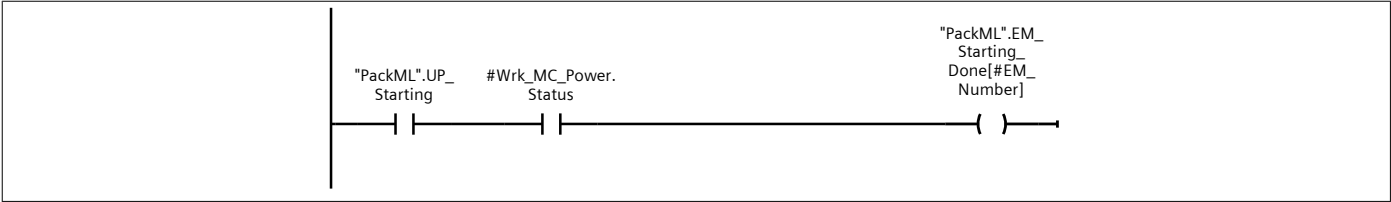
Network 1: First scan initialization

Reset power enable

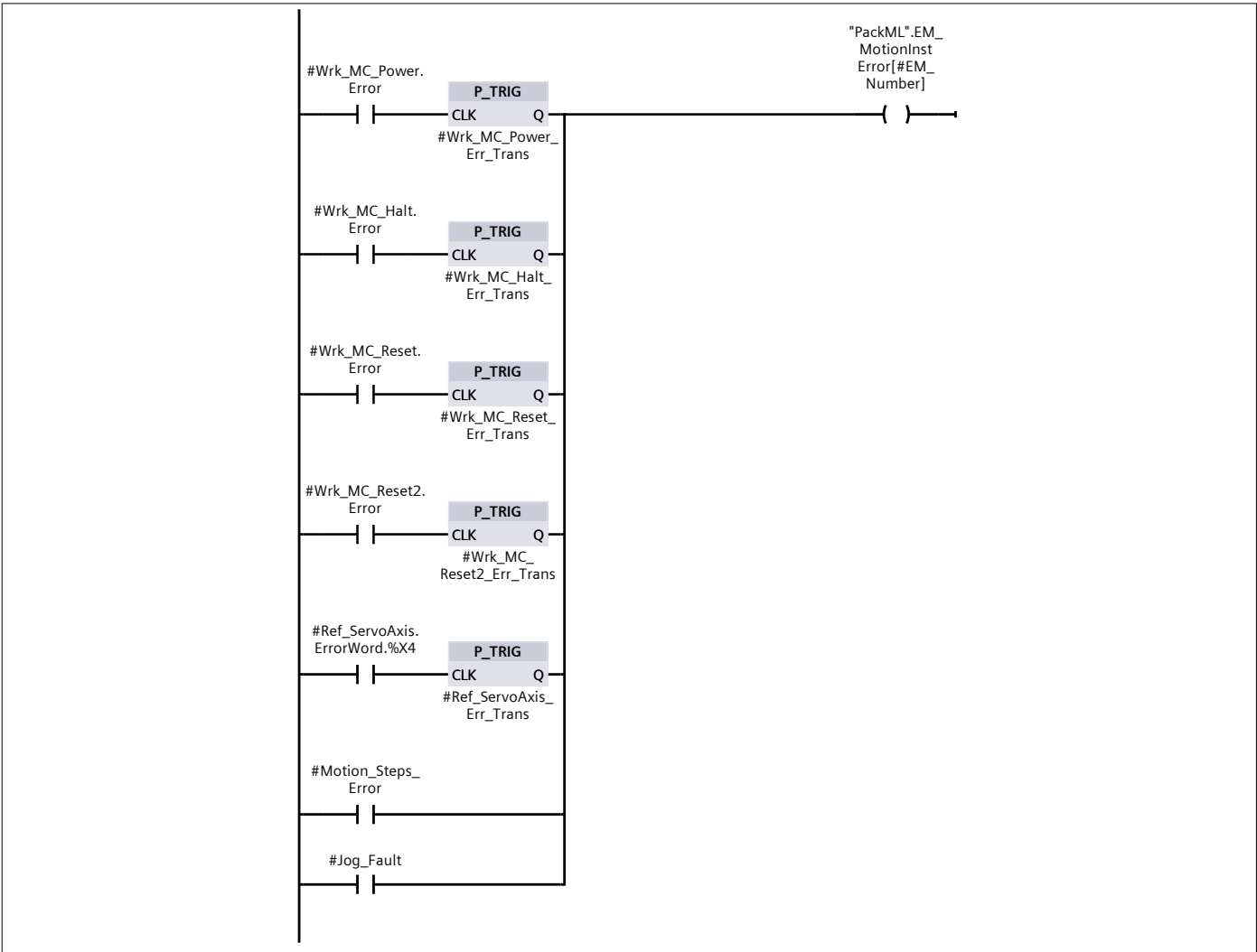


Network 2: State completion for STARTING

Starting - Check of power status is probably not absolutely necessary. Other starting tasks, such as gearing, could go here.

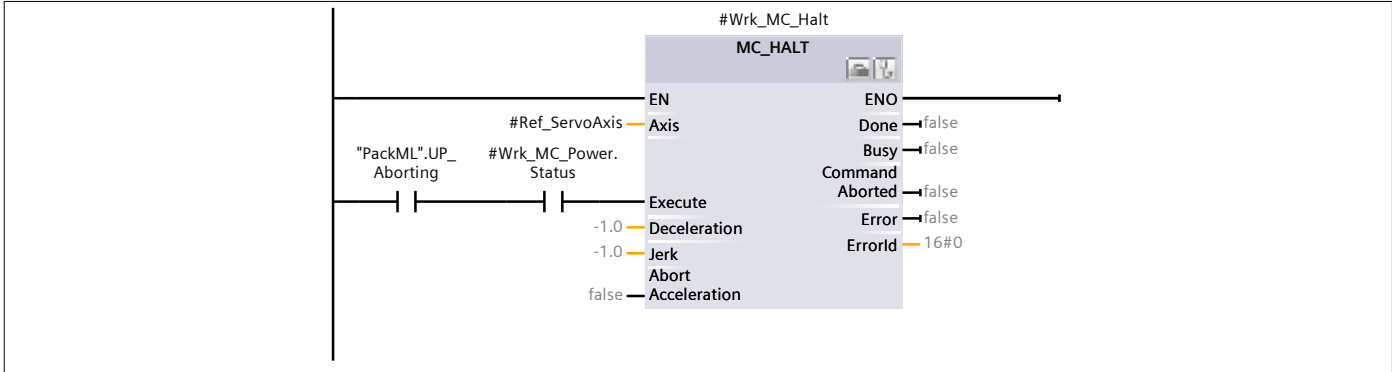


Network 3: Handle errors from motion blocks



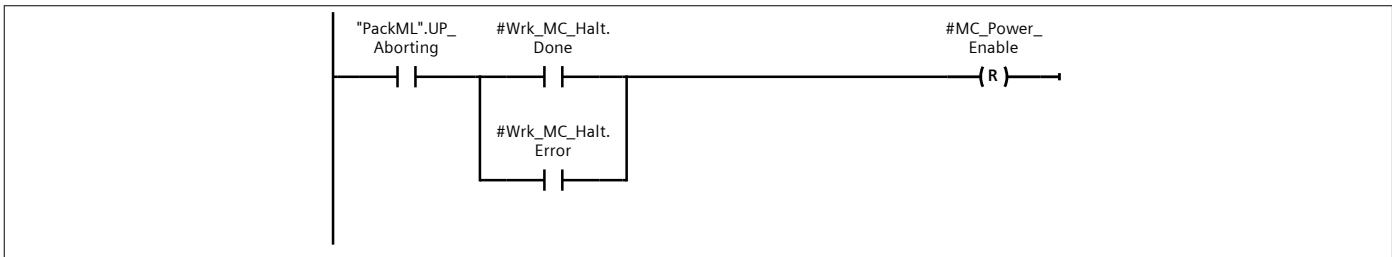
Network 4: MC_Halt block

If axis power not on, if do halt will generate unnecessary error



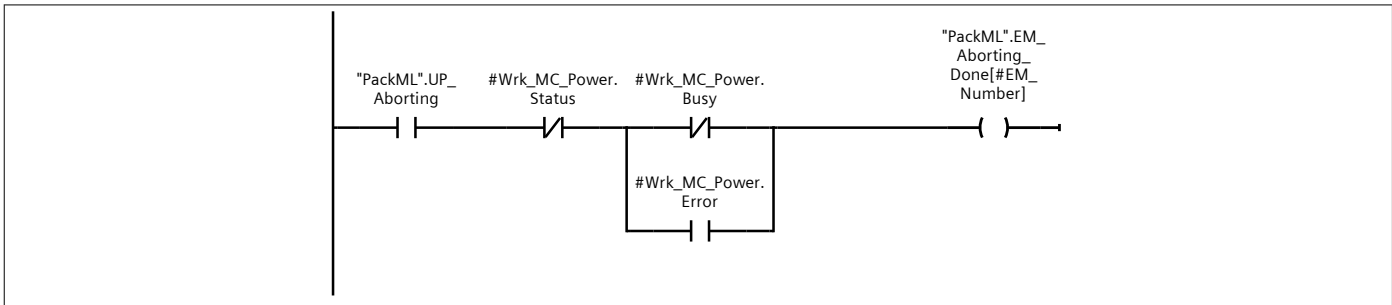
Network 5: Reset MC_Power enable as part of aborting

Resetting Enable input to MC_Power disables axis.



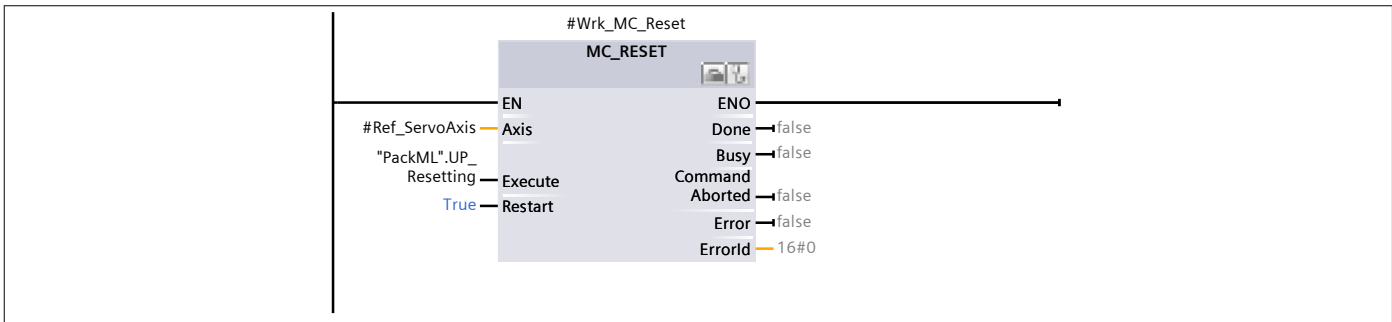
Network 6: State completion for ABORTING

Wait for status to be off before transitioning to next step.



Network 7: RESETTING - MC_Reset block

RESETTING - first reset any errors and faults

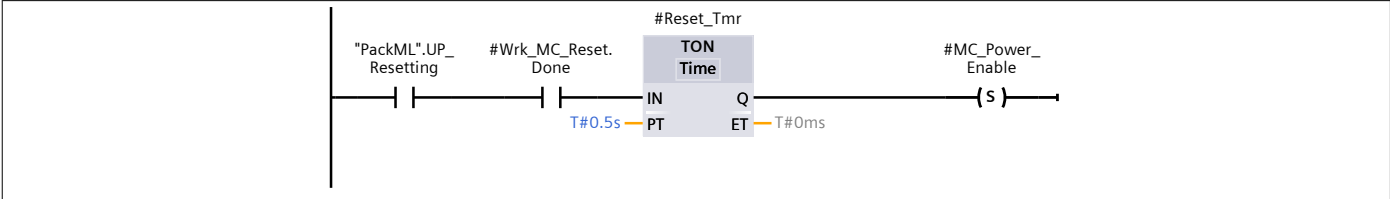


Network 8: RESETTING - Set MC_Power enable input

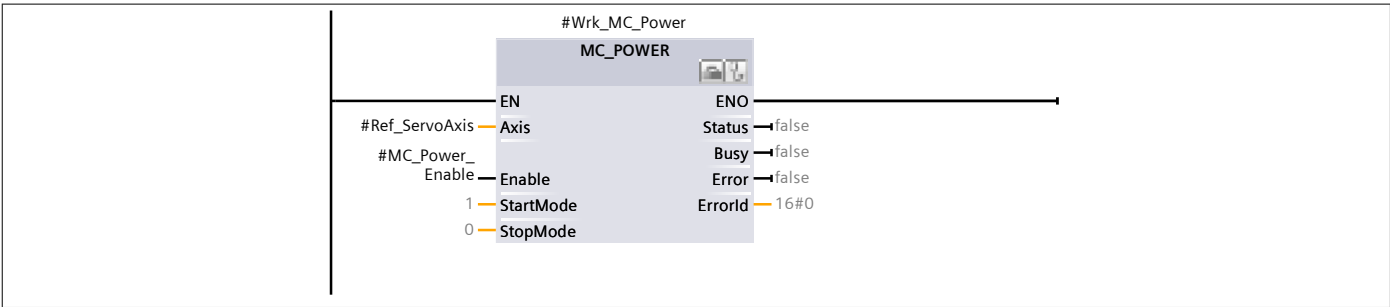
RESETTING -

When faults reset, wait 1/2 sec before setting Enable input of MC_Power. Wait for status
Next state is IDLE

Timer seems to be necessary. If no delay, MC_Power faults

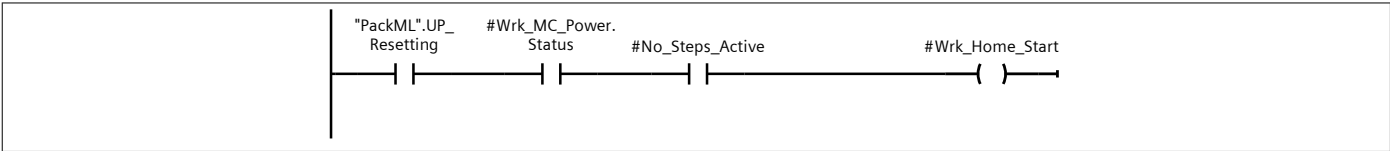


Network 9: RESETTING - MC_Power for axis



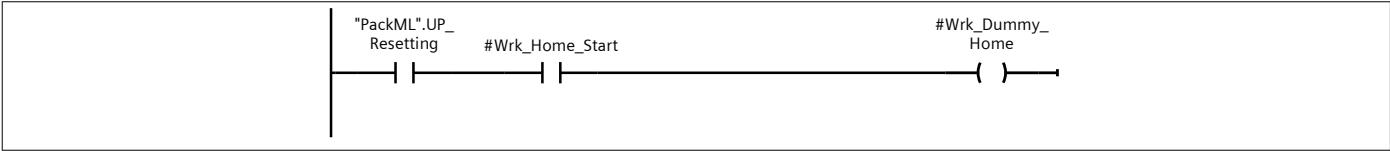
Network 10: RESETTING - ready for homing

RESETTING - Power status good and steps from motion steps are all off.

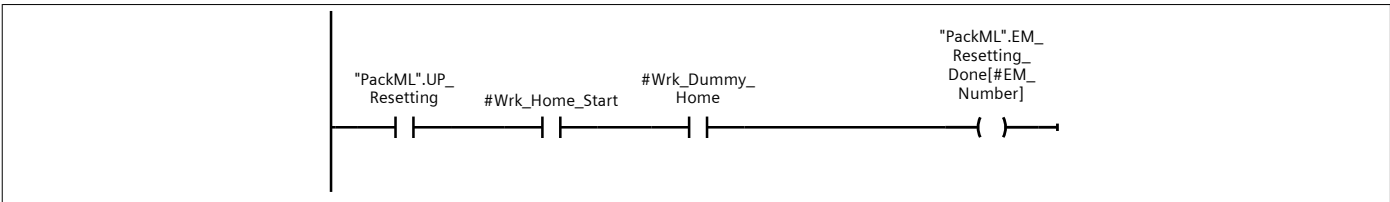


Network 11: Handle homing

Homing not valid for this system, so no call to EM01_CM04_ServoAxisHome FB

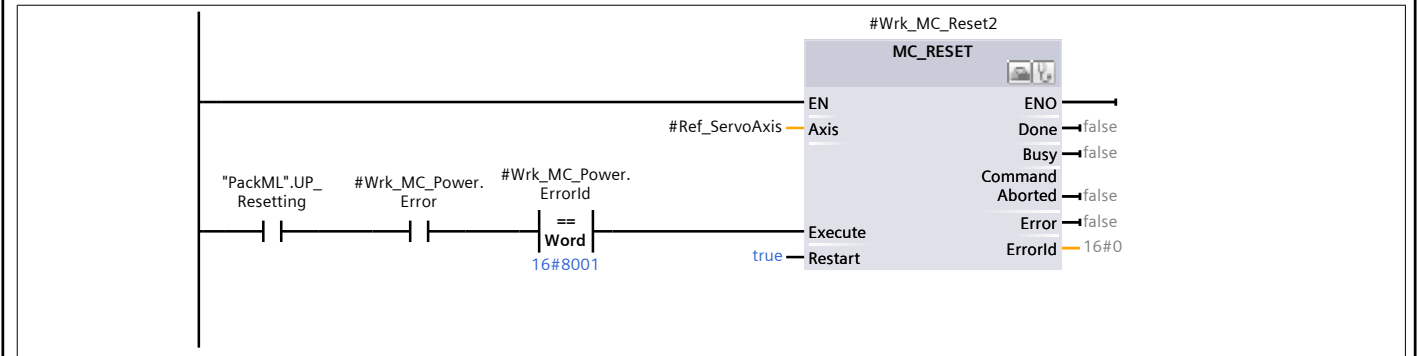


Network 12: RESETTING - state completion when homed

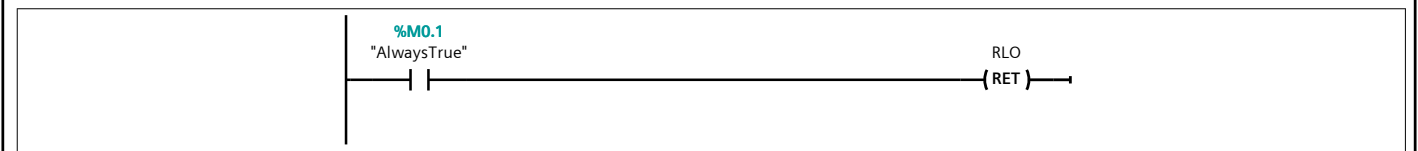


Network 13: Handle technology alarm from MC_Power

If the error is a technology alarm when resetting, clear the error in an attempt to let the MC_Power complete



Network 14: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



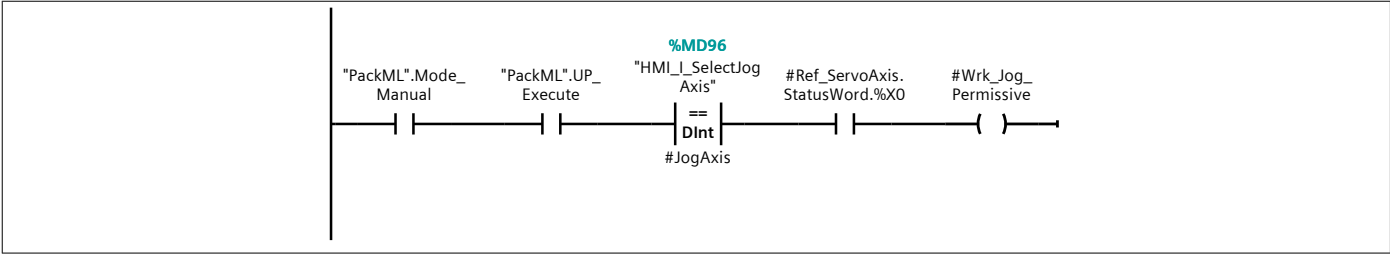
Program blocks / EM02_Axis_Line

EM02_CM03_ServoAxisJog [FB304]

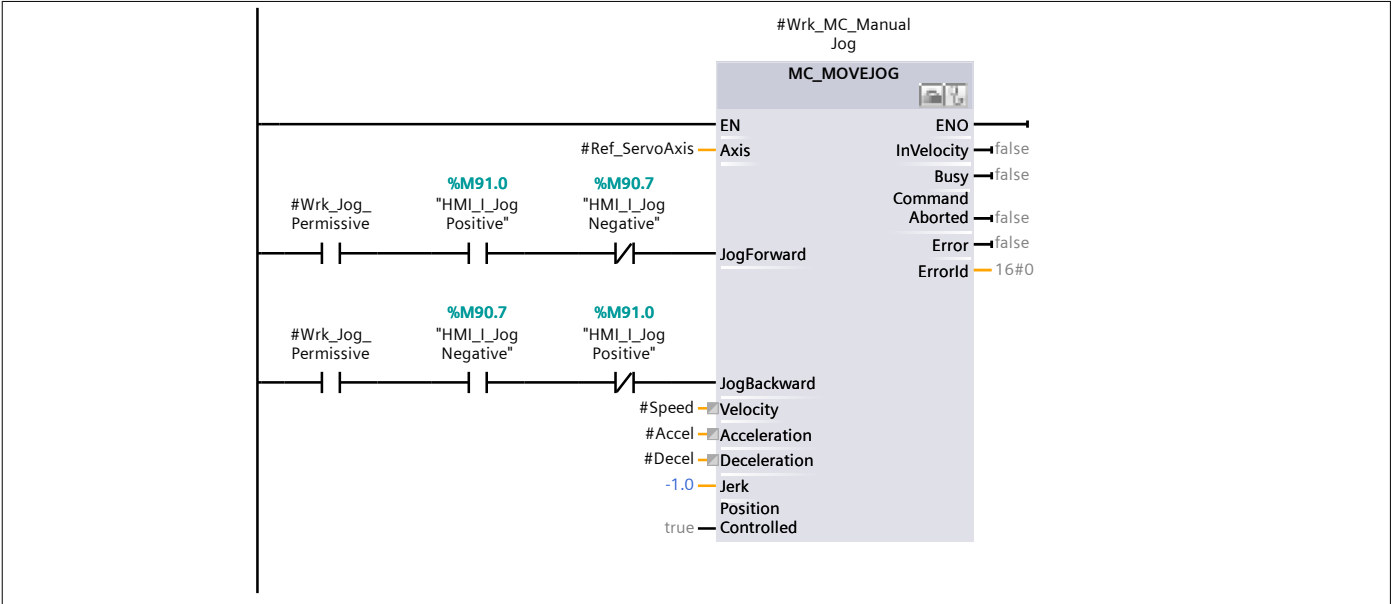
EM02_CM03_ServoAxisJog Properties					
General					
Name	EM02_CM03_ServoAxis-Jog	Number	304	Type	FB
Language	LAD	Numbering	Manual		
Information					
Title	Jog servo axis in manual mode	Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
JogAxis	DInt	0	Non-retain
Speed	Real	0.0	Non-retain
Accel	Real	0.0	Non-retain
Decel	Real	0.0	Non-retain
▼ Output			
JogFault	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
Wrk_Jog_Permissive	Bool	false	Non-retain
Wrk_MC_ManualJog	MC_MOVEJOG		
Temp			
Constant			

Network 1: Release jog function (-> Select EM number via HMI)



Network 2: Jog Servo Axis



Network 3: Fault Reset



Network 4:



Network 5: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM02_Axis_Line

EM02 [DB300]

EM02 Properties

General

Name	EM02	Number	300	Type	DB
Language	DB	Numbering	Manual		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	False
Wrk_NoStepsActive	Bool	false	False
Wrk_MotionStepsError	Bool	false	False
Wrk_JogFault	Bool	false	False
CM00_Procedure	"EM02_CM00_Procedure"		False
CM02_ServoAxisObject	"EM02_CM02_ServoAxisObject"		False
CM03_ServoAxisJog	"EM02_CM03_ServoAxisJog"		False

Program blocks / EM03_Axis_Right

EM03_00_Main [FB400]

EM03_00_Main Properties

General

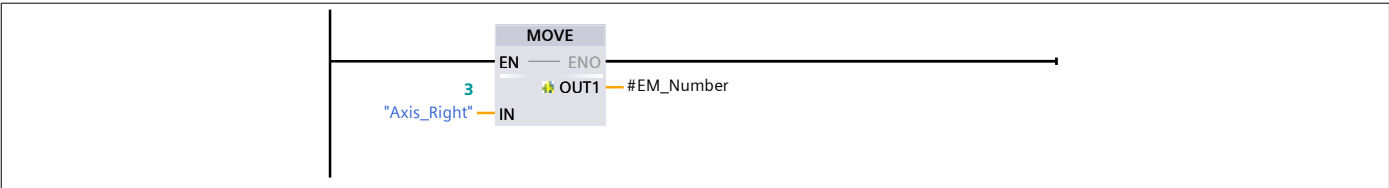
Name	EM03_00_Main	Number	400	Type	FB
Language	LAD	Numbering	Manual		

Information

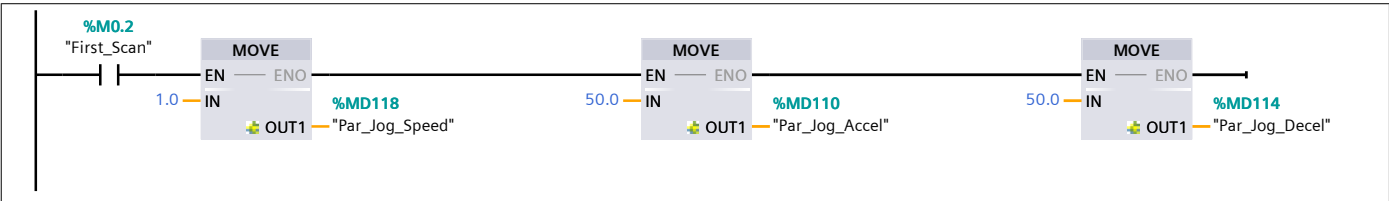
Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	Non-retain
Wrk_NoStepsActive	Bool	false	Non-retain
Wrk_MotionStepsError	Bool	false	Non-retain
Wrk_JogFault	Bool	false	Non-retain
CM00_Procedure	"EM03_CM00_Procedure"		
CM02_ServoAxisObject	"EM03_CM02_ServoAxisObject"		
CM03_ServoAxisJog	"EM03_CM03_ServoAxisJog"		
Temp			
Constant			

Network 1:

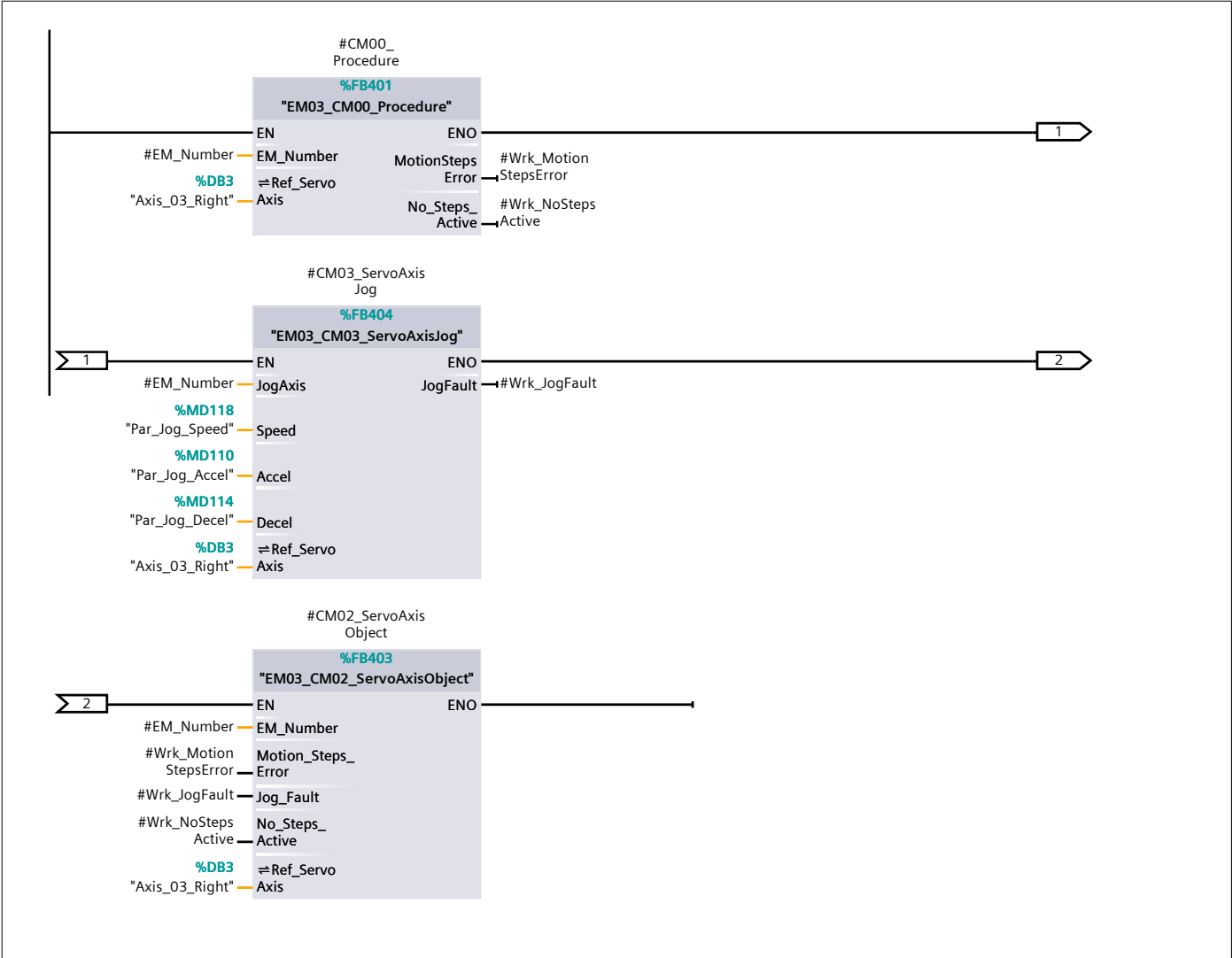


Network 2:



Network 3: Call other function blocks

Servo axis, procedure and jogging



Program blocks / EM03_Axis_Right

EM03_CM00_Procedure [FB401]

EM03_CM00_Procedure Properties

General

Name	EM03_CM00_Procedure	Number	401	Type	FB
Language	LAD	Numbering	Manual		

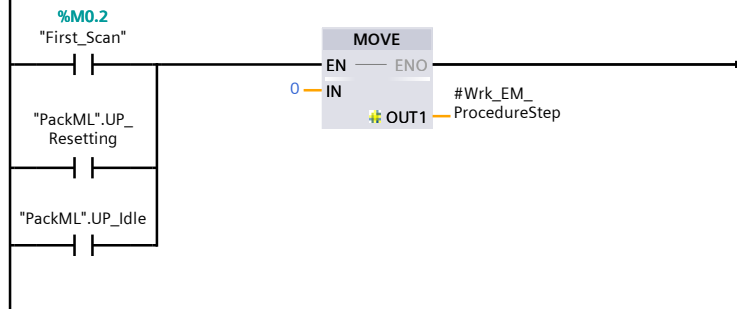
Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
▼ Output			
MotionStepsError	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_Synchronou- sAxis		
▼ Static			
Wrk_MC_MoveVel	MC_MOVEVELOCI- TY		
Wrk_MC_MotionInVelocity	MC_MOTIONINVE- LOCITY		
Wrk_MC_Halt	MC_HALT		
Axis_Speed	Real	0.0	Non-retain
Do_Torque_Limit	Bool	false	Non-retain
Torque_Limit_Calc	Real	0.0	Non-retain
Axis_Speed_Temp	Real	0.0	Non-retain
Motion_InVelocity_Enable	Bool	false	Non-retain
Wrk_MC_MoveVel_Err_Trans	Bool	false	Non-retain
Wrk_MC_MotionInVelocity_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqueLimit_Err_Trans	Bool	false	Non-retain
Wrk_MC_TorqLimit	MC_TORQUELIMIT- ING		
Start_Move	Bool	false	Non-retain
Wrk_EM_ProcedureNoStepsActive	Bool	false	Non-retain
Wrk_EM_ProcedureStep	DInt	0	Non-retain
Temp			
Constant			

Network 1: Reset of all steps

First scan or resetting or idle - clear all steps

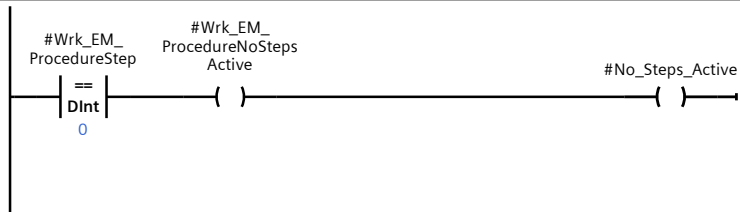


Network 2:

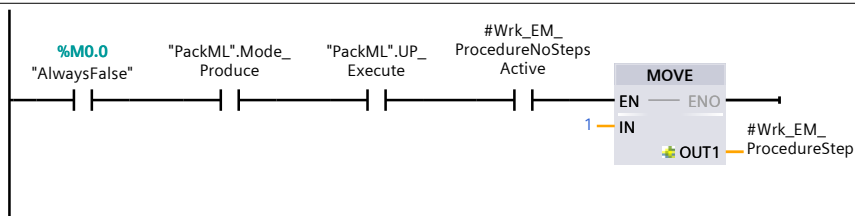
```
0001 IF "Line_Tension_Desired" <= 0.0 THEN
0002     "Line_Tension_Desired" := 1.0;
0003 END_IF;
```

Network 3: Indication that all steps reset

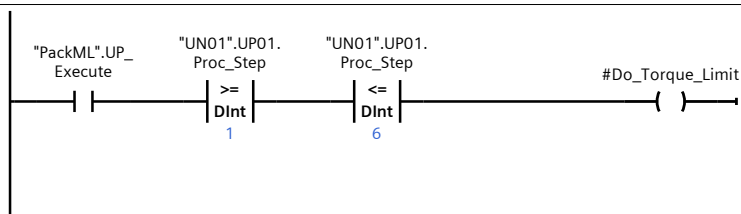
Used by RESETTING state and initial execute step



Network 4: Never start this procedure's steps



Network 5: Steps where torque is limited



Network 6: Toque limit calculation and setting

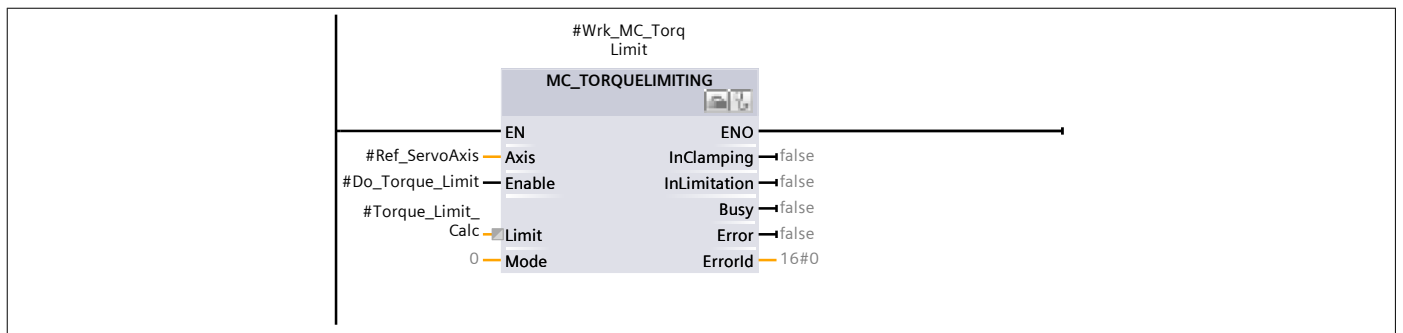
Toque in Nm, not percent of max

```

0001 IF #Do_Torque_Limit THEN
0002     #Torque_Limit_Calc := "Line_Tension_Desired" * ("Right_Roll_Radi-
        us" / 1000.0);
0003     IF "Line_Move_Right" THEN
0004         #Torque_Limit_Calc := #Torque_Limit_Calc + "Additional_Torque";
0005     END_IF;
0006     IF #Torque_Limit_Calc > "Motor_Torque_Max" THEN
0007         #Torque_Limit_Calc := "Motor_Torque_Max";
0008     END_IF;
0009 ELSE
0010     #Torque_Limit_Calc := "Motor_Torque_Max";
0011 END_IF;
0012 "Takeup_Torque_Limit" := #Torque_Limit_Calc;
0013

```

Network 7:

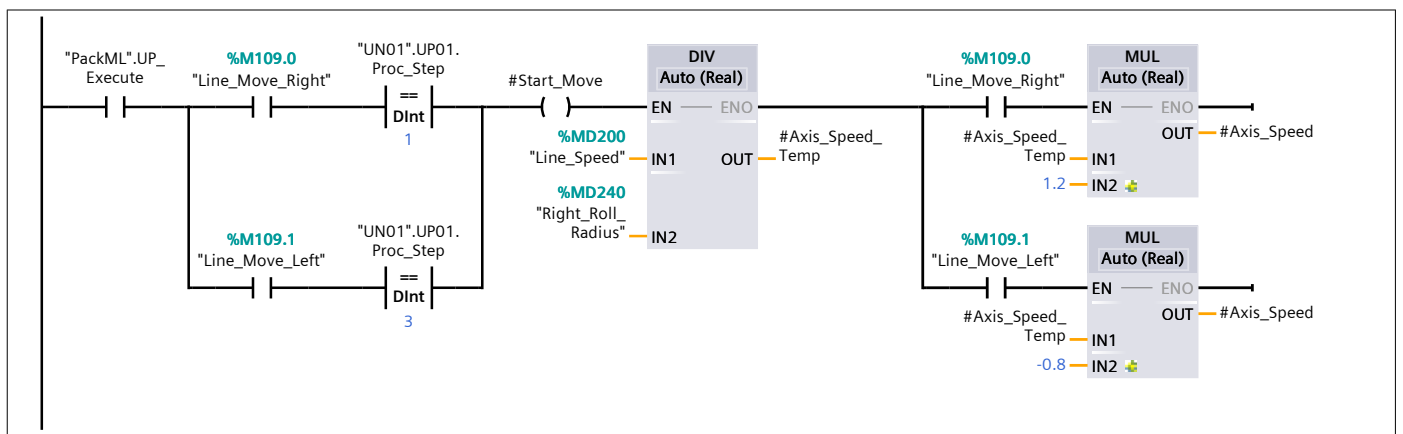


Network 8: UP Procedure Step 1 or 3 - set direction and axis speed

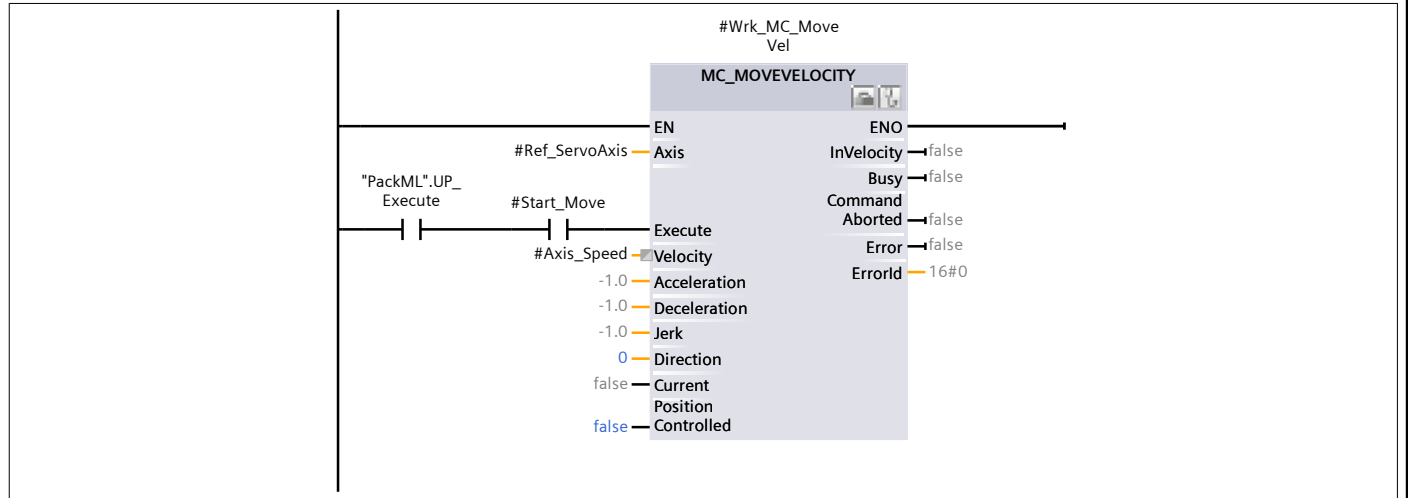
Speed in radians/sec

If rewinding, set speed 50% higher than normal to provide tension

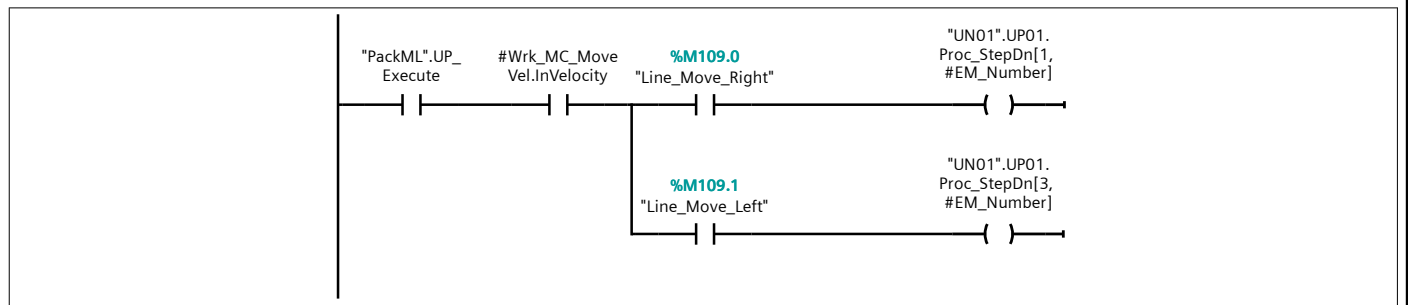
If unwinding, set speed 50% lower than normal



Network 9: UP Procedure Step 2 - start this axis moving

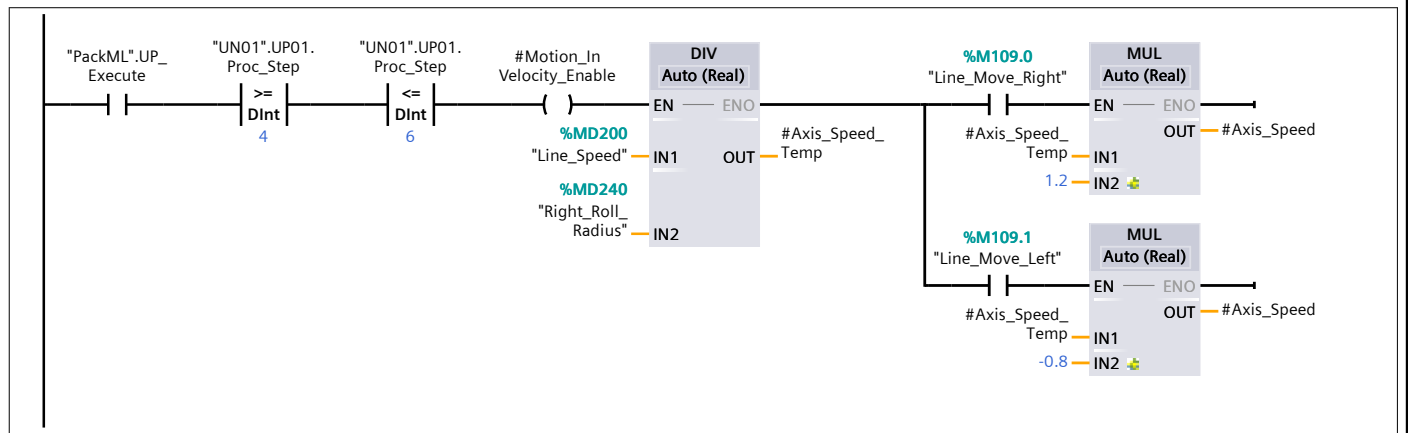


Network 10: UP Procedure Step 1 to 3 transition - axis moving

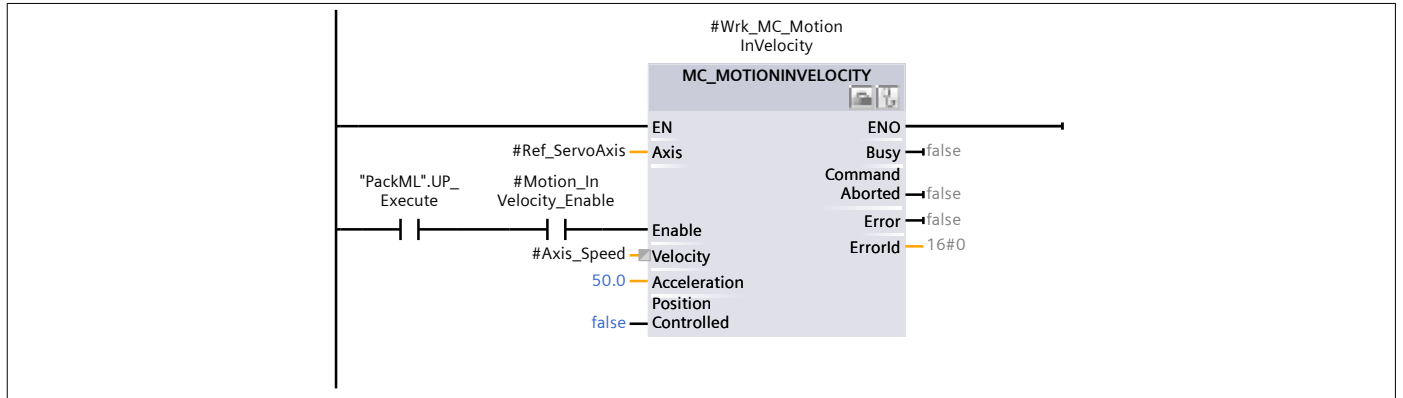


Network 11: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and reel radius

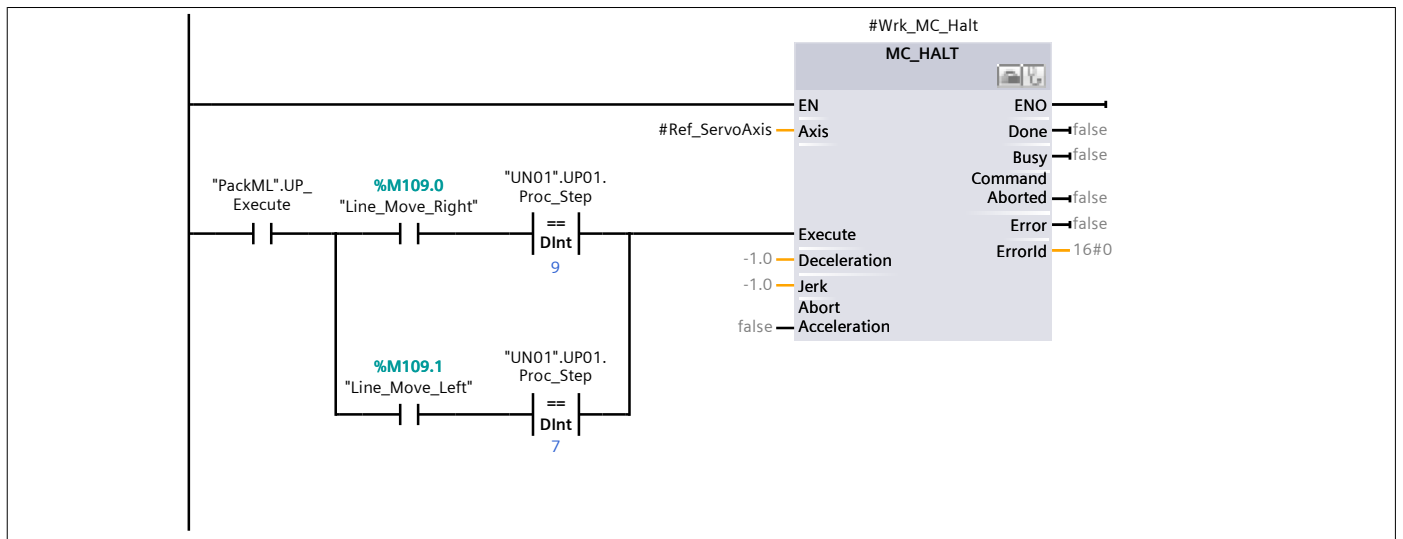
If unwinder, speed must be negative.



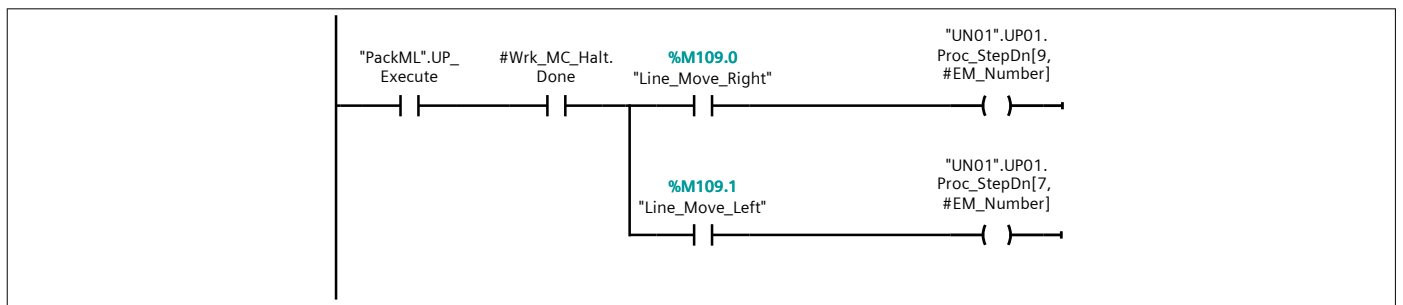
Network 12: UP Procedure Steps 4 to 6 - change speed of axis based on line speed and reel radius



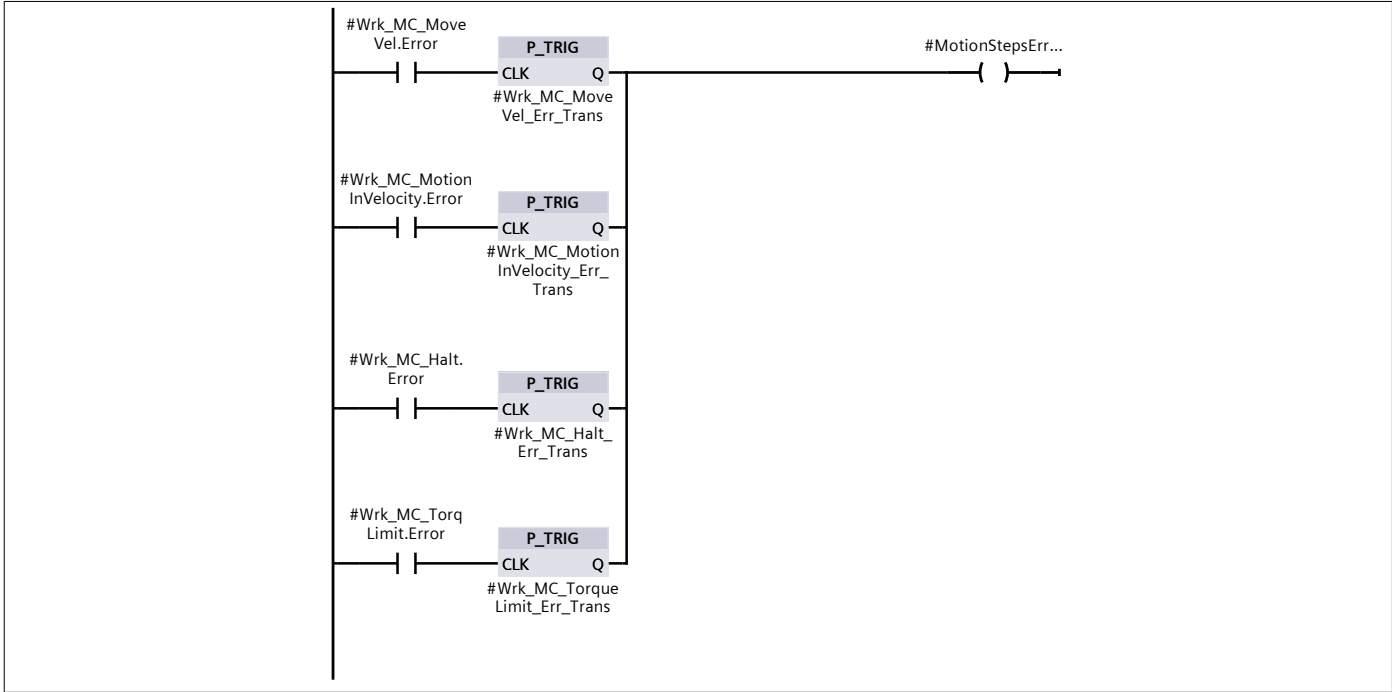
Network 13: UP Procedure Steps 7 or 9 - Stop axis



Network 14: UP Procedure Step 7 or 9 transition - axis stopped



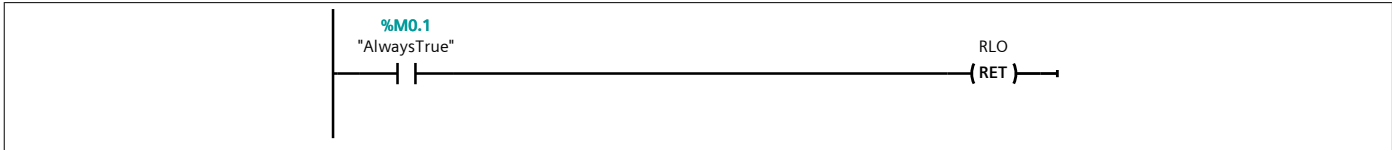
Network 15: Copy motion block errors to axis error flag



Network 16: Speed, torque of axis.

```
0001 "Right_Roll_Speed" := "Axis_03_Right".ActualVelocity;  
0002 "Right_Roll_Torque" := "Axis_03_Right".StatusTorqueData.ActualTorque;  
0003
```

Network 17: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM03_Axis_Right

EM03_CM02_ServoAxisObject [FB403]

EM03_CM02_ServoAxisObject Properties

General

Name	EM03_CM02_ServoAxisObject	Number	403	Type	FB
Language	LAD	Numbering	Manual		

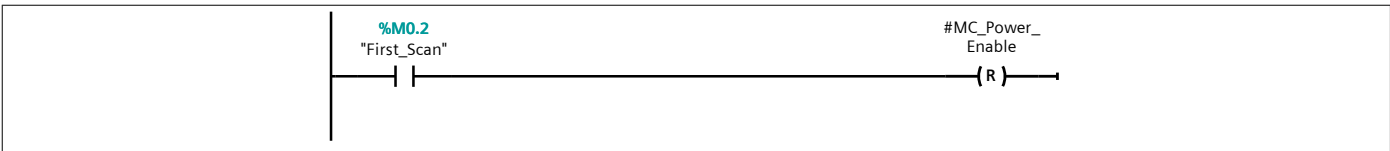
Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
EM_Number	DInt	0	Non-retain
Motion_Steps_Error	Bool	false	Non-retain
Jog_Fault	Bool	false	Non-retain
No_Steps_Active	Bool	false	Non-retain
Output			
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
MC_Power_Enable	Bool	false	Retain
Wrk_Home_Start	Bool	false	Non-retain
Wrk_MC_Power	MC_POWER		
Wrk_MC_Halt	MC_HALT		
Wrk_MC_Reset	MC_RESET		
Wrk_MC_Reset2	MC_RESET		
Wrk_Dummy_Home	Bool	false	Non-retain
Wrk_MC_Power_Err_Trans	Bool	false	Non-retain
Wrk_MC_Halt_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset_Err_Trans	Bool	false	Non-retain
Wrk_MC_Reset2_Err_Trans	Bool	false	Non-retain
Ref_ServoAxis_Err_Trans	Bool	false	Non-retain
Reset_Tmr	IEC_TIMER		Non-retain
Temp			
Constant			

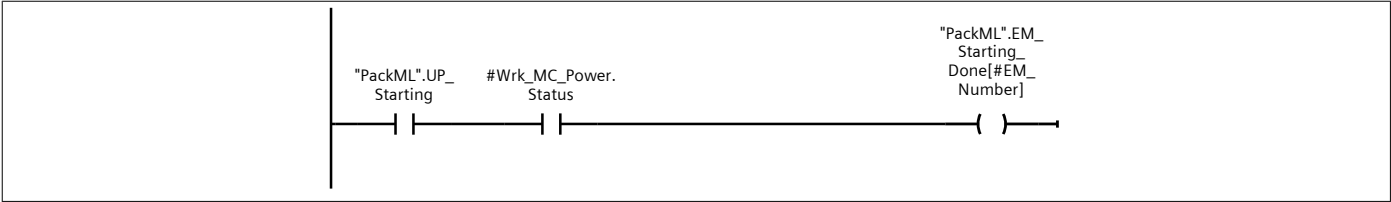
Network 1: First scan initialization

Reset power enable

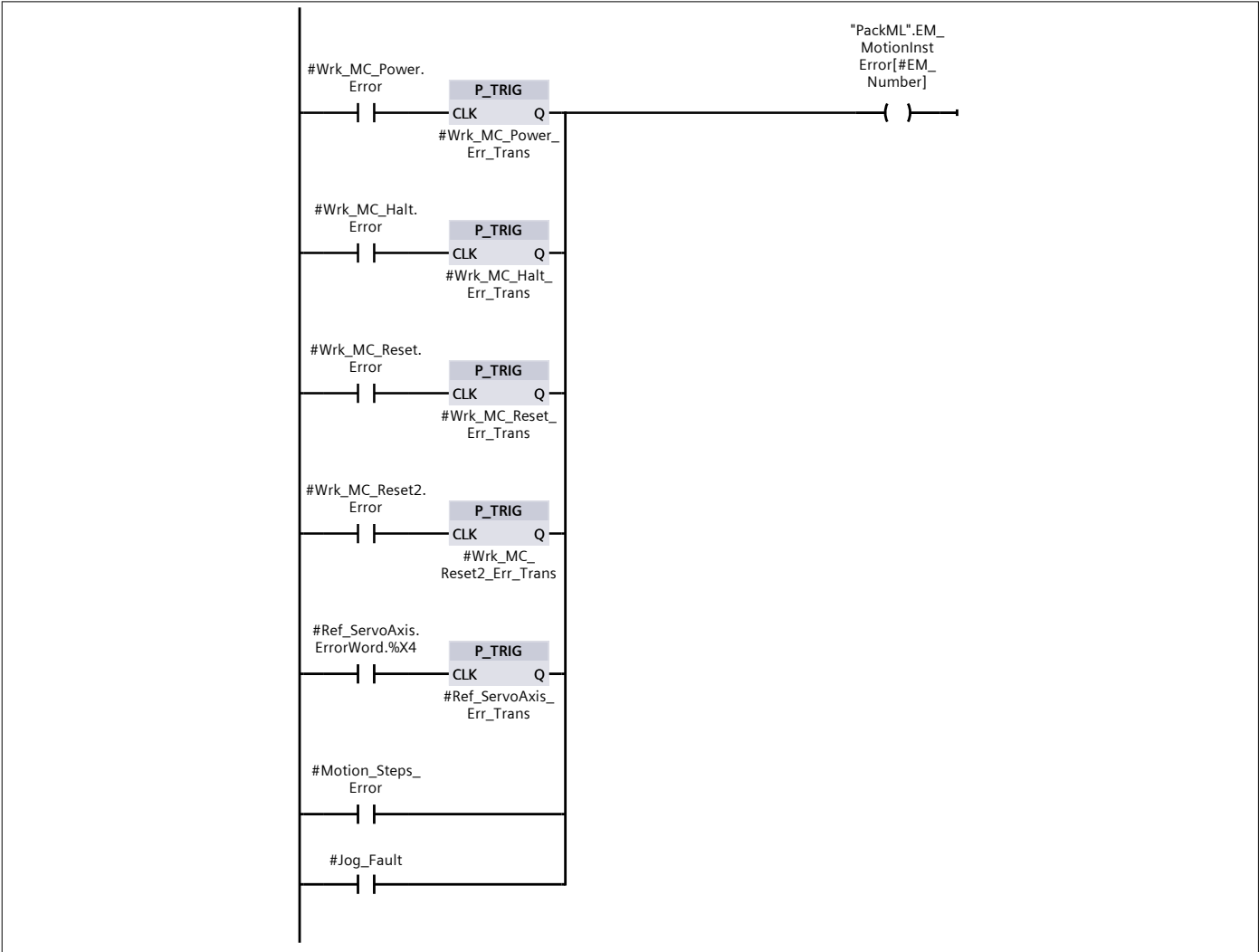


Network 2: State completion for STARTING

Starting - Check of power status is probably not absolutely necessary. Other starting tasks, such as gearing, could go here.

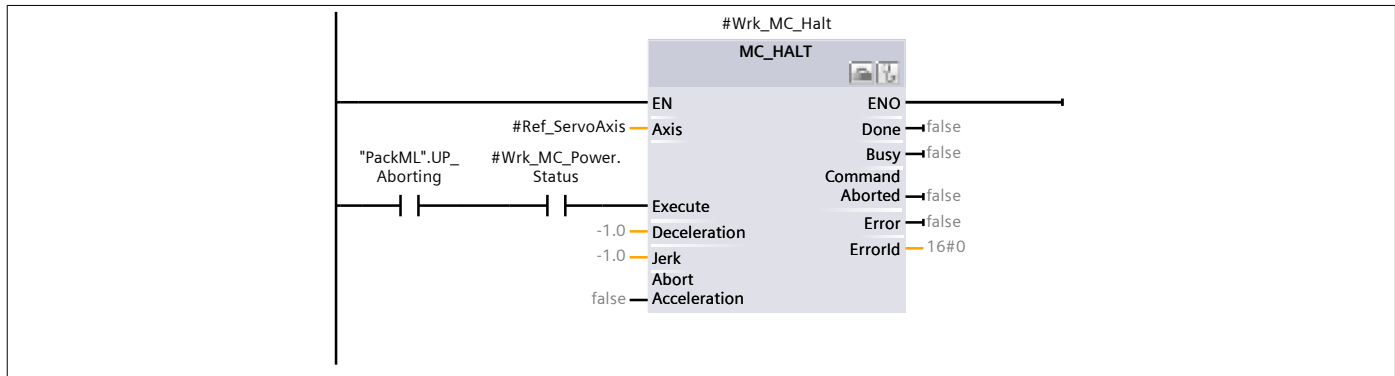


Network 3: Handle errors from motion blocks



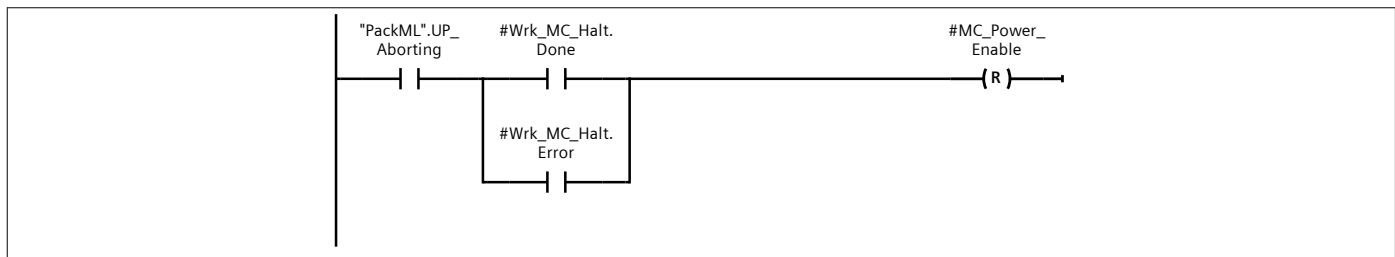
Network 4: MC_Halt block

If axis power not on, if do halt will generate unnecessary error



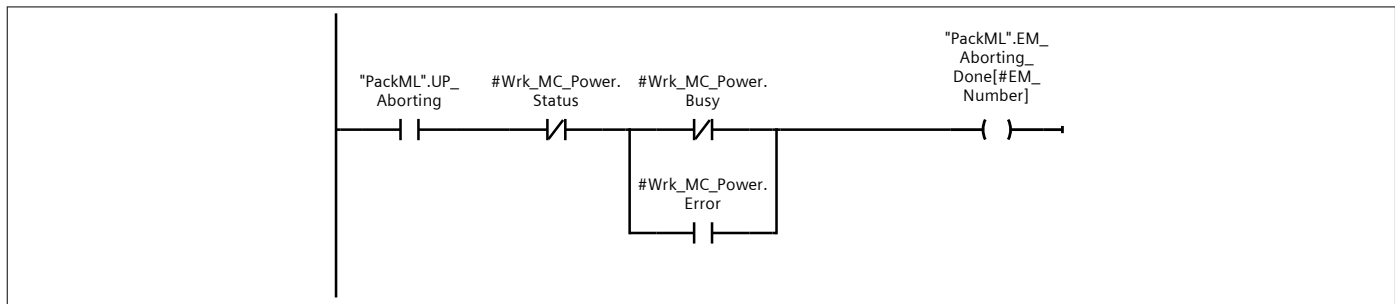
Network 5: Reset MC_Power enable as part of aborting

Resetting Enable input to MC_Power disables axis.



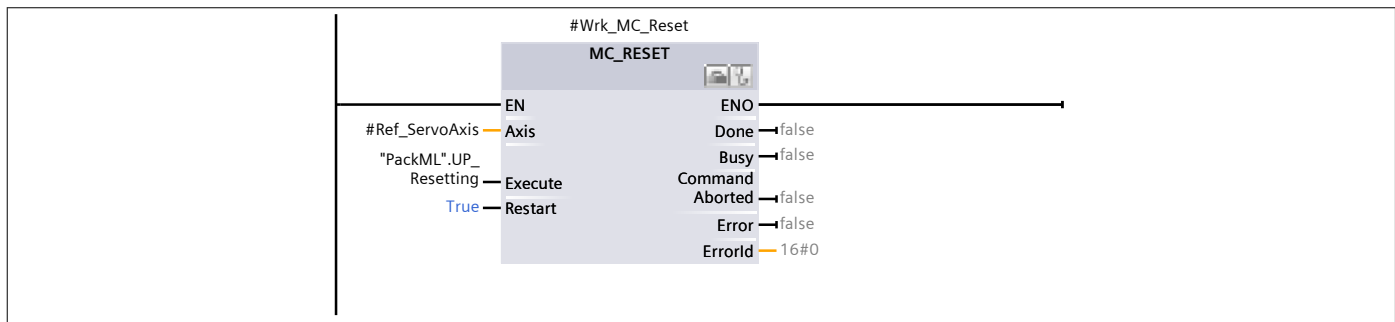
Network 6: State completion for ABORTING

Wait for status to be off before transitioning to next step.



Network 7: RESETTING - MC_Reset block

RESETTING - first reset any errors and faults

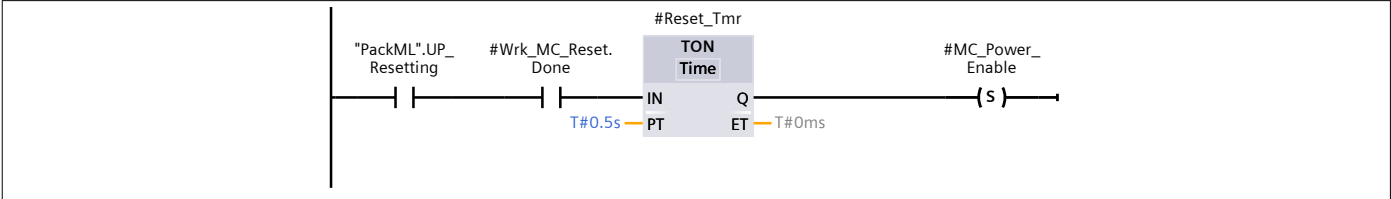


Network 8: RESETTING - Set MC_Power enable input

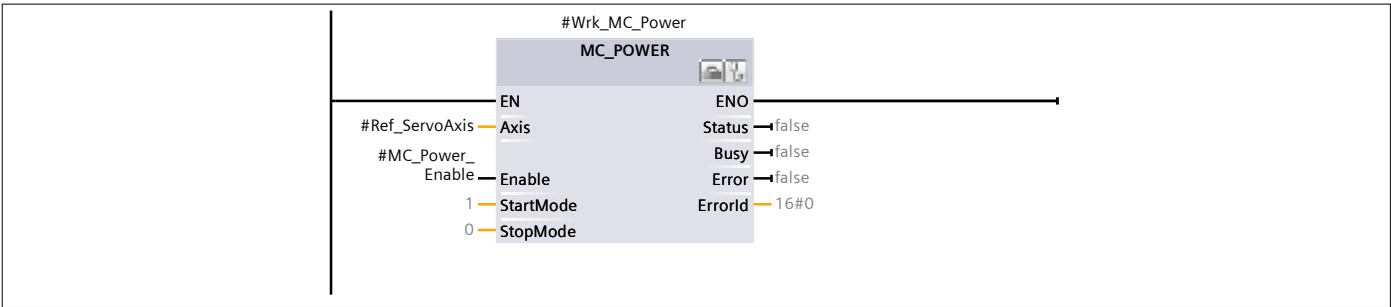
RESETTING -

When faults reset, wait 1/2 sec before setting Enable input of MC_Power. Wait for status
Next state is IDLE

Timer seems to be necessary. If no delay, MC_Power faults

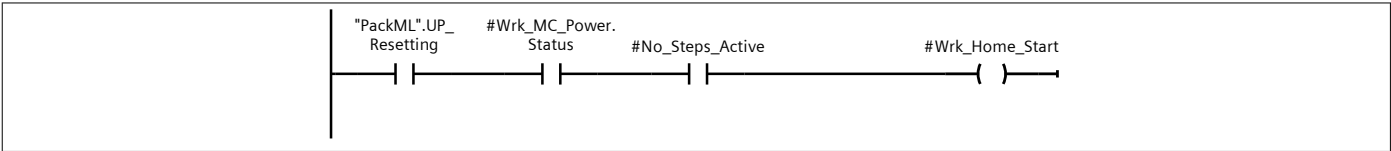


Network 9: RESETTING - MC_Power for axis



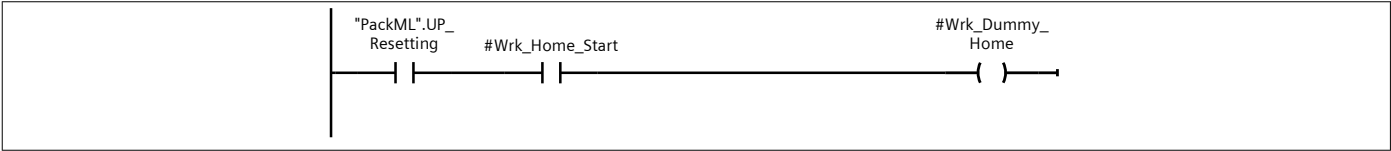
Network 10: RESETTING - ready for homing

RESETTING - Power status good and steps from motion steps are all off.

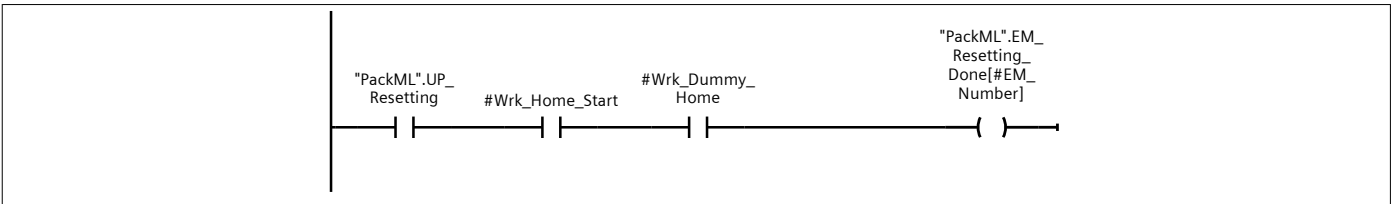


Network 11: Handle homing

Homing not valid for this system, so no call to EM01_CM04_ServoAxisHome FB

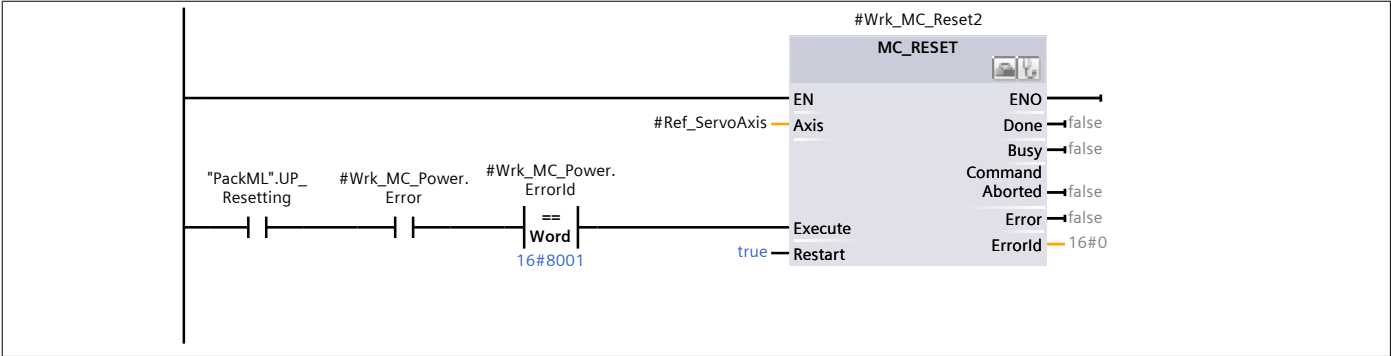


Network 12: RESETTING - state completion when homed

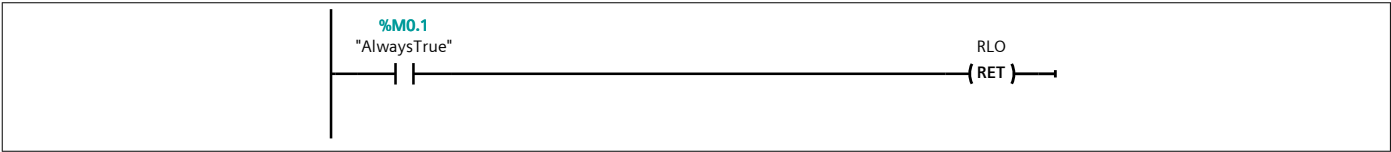


Network 13: Handle technology alarm from MC_Power

If the error is a technology alarm when resetting, clear the error in an attempt to let the MC_Power complete



Network 14: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM03_Axis_Right

EM03_CM03_ServoAxisJog [FB404]

EM03_CM03_ServoAxisJog Properties

General

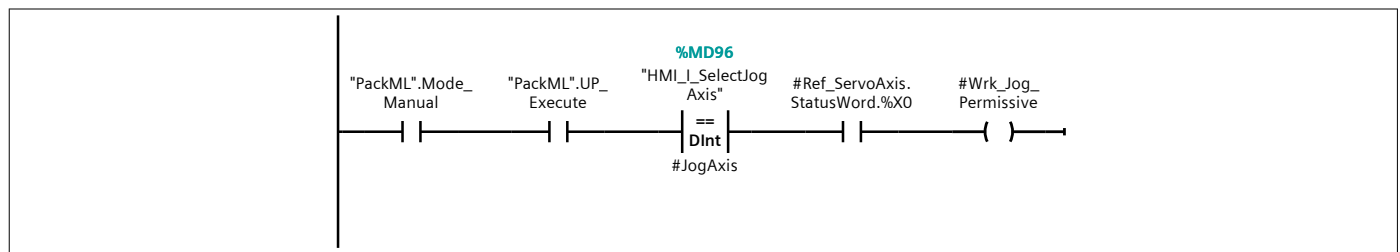
Name	EM03_CM03_ServoAxis-Jog	Number	404	Type	FB
Language	LAD	Numbering	Manual		

Information

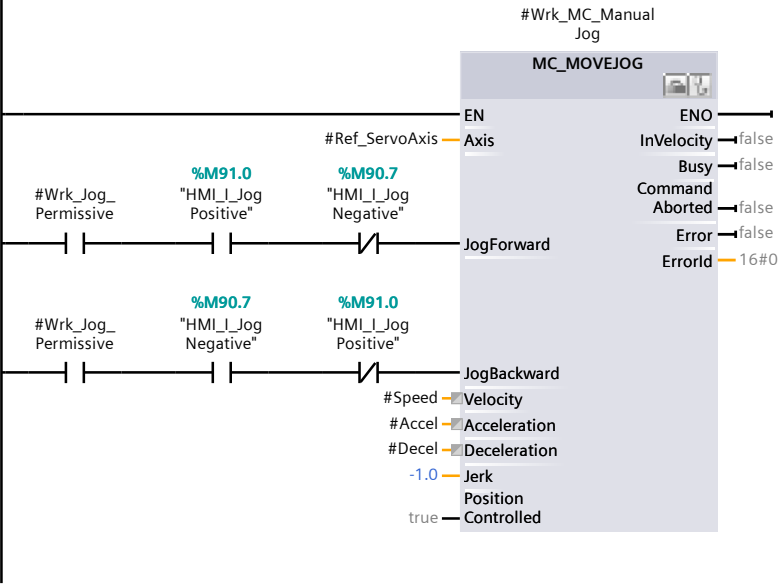
Title	Jog servo axis in manual mode	Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value	Retain
▼ Input			
JogAxis	DInt	0	Non-retain
Speed	Real	0.0	Non-retain
Accel	Real	0.0	Non-retain
Decel	Real	0.0	Non-retain
▼ Output			
JogFault	Bool	false	Non-retain
▼ InOut			
Ref_ServoAxis	TO_PositioningAxis		
▼ Static			
Wrk_Jog_Permissive	Bool	false	Non-retain
Wrk_MC_ManualJog	MC_MOVEJOG		
Wrk_MC_TorqLimit	MC_TORQUELIMIT-ING		
Temp			
Constant			

Network 1: Release jog function (-> Select EM number via HMI)

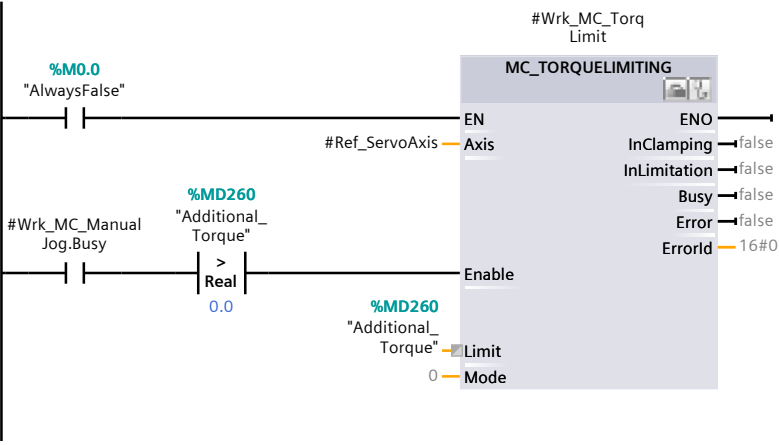


Network 2: Jog Servo Axis

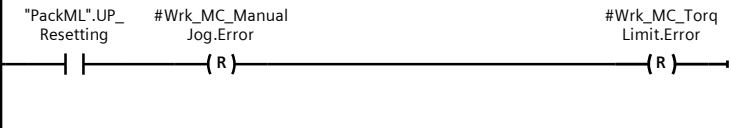


Network 3: Test of additional torque required to move axis with no load

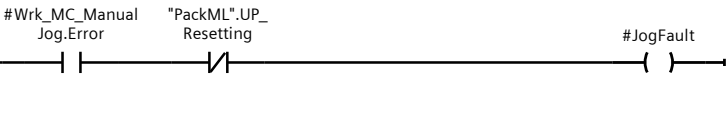
Cannot have two instances of this block for the axis. So, if used to find the breakaway torque of an axis, must disable the instance of this in the CM00_Procedure FB



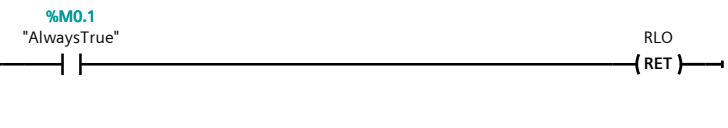
Network 4: Fault Reset



Network 5:



Network 6: END: Update the ENO Output. (DO NOT REMOVE. Must be last rung)



Program blocks / EM03_Axis_Right

EM03 [DB400]

EM03 Properties

General

Name	EM03	Number	400	Type	DB
Language	DB	Numbering	Manual		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
EM_Number	DInt	0	False
Wrk_NoStepsActive	Bool	false	False
Wrk_MotionStepsError	Bool	false	False
Wrk_JogFault	Bool	false	False
CM00_Procedure	"EM03_CM00_Procedure"		False
CM02_ServoAxisObject	"EM03_CM02_ServoAxisObject"		False
CM03_ServoAxisJog	"EM03_CM03_ServoAxisJog"		False