

Homing Sequence (S44) AOI

With the [CMMT_EIP_MotionLib](#) Library, the [PTP_Drives_Festo_EIP](#) AOI (Add-On Instruction) is used for control of the CMMT for all motion:

PTP_Drives_Festo_EIP
AOI

ModePos Meaning:
 1 = Direct mode, Relative position control
 2 = Direct mode, Absolute position control
 3 = Setup Mode (Velocity)
 4 = Reference point approach (Execute FAS Configured Routine)
 5 = Set Reference Point (Set Current Position to Zero with FAS zero point offset)
 6 = Traversing block (Record selection)
 7 = Jog Mode
 8 = Incremental Jogging / Inching (Relative Positions FAS=P1.214530.0.0 and P1.214538.0.0)

PTP_Drives_Festo_EIP	
PTP_Drives_Festo_EIP	Axis_X_FB ...
I_O_I_n_t_e_r_f_a_c_e	0
DRV_Status	CMMT_AS_Axis_X:11.Data
DRV_Control	CMMT_AS_Axis_X:01.Data
C_o_n_t_r_o_l_A_r_e_a	0
ModePos	4
EnableAxis	1
CancelTraversing	1
IntermediateStop	1
Positive	0
Negative	0
Jog1	0
Jog2	0
AckError	0
ReleaseBrake	0
TravelToFixStop	0
ExecuteMode	0
Position	140000
Velocity	80
OverV	100
OverAcc	100
OverDec	100
ConfigEPos	15
BaseSpeedValue	5.0
ConnectionFaulted	CMMT_AS_Axis_X:11.ConnectionFaulted
M_o_n_i_t_o_r_A_r_e_a	0
ActVelocity	8.10106285e-004
ActPosition	0
ActMode	4
EposZSW1	0
EposZSW2	4
ActWarn	0
ActFault	0
Status	16#7002

AxisEnabled

AxisPosOk

AxisSpFixed

AxisAckSetpoint

ClampTorqueReached

AxisRef

AxisWarn

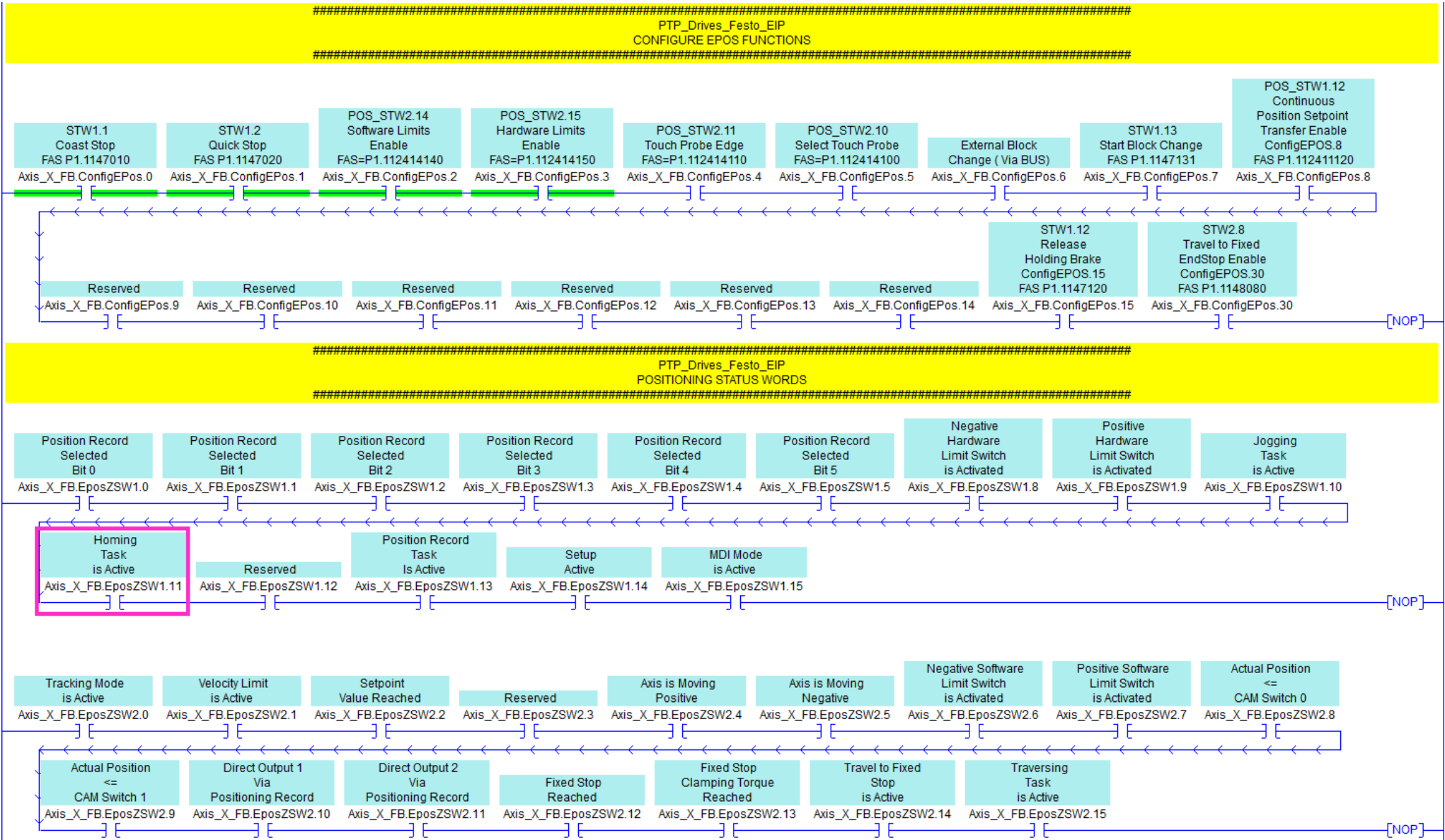
AxisError

Lockout

Error

Homing Sequence (S44) Configuration & Status

In addition to the AOI (Add-On Instruction) tags shown above, there are also configuration and status bits added to the sample code as shown here:



Homing Sequence (S44) Process Data

The following IO (Inputs/Outputs) from Telegram 111 Process Data are to be used to program the Homing Sequence (S44):

PnP MODE																			
NOTE: Telegram 111 is a SIEMENS specific extension of PROFIDrive. (Siemens telegram 111)																			
STATUS			B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0	
	WORD0	ZSW1	ZSW1.15 Drive Decelerating	ZSW1.14 Drive Accelerating	ZSW1.13 Drive Stopped AxisSpFixed	ZSW1.12 Traverse Task Acknowledge AxisAckSetpoint FAS P1.1145121	ZSW1.11 Reference/Home Completed AxisRef	ZSW1.10 Traverse Task Motion Complete AxisPosOk FAS P1.1145101	ZSW1.9 PLC Control Requested	ZSW1.8 Following Error Within Tolerance Range	ZSW1.7 Warning Active AxisWarn	ZSW1.6 Switch On Inhibited Lockout	ZSW1.5 Quick Stop When=0	ZSW1.4 Coast Stop When=0	ZSW1.3 Fault Active AxisError	ZSW1.2 Operation Enabled AxisEnabled	ZSW1.1 Ready To Operate sbReady	ZSW1.0 Ready to Switch On	
	WORD1	POS_ZSW1 or Epos_ZSW1	POS_ZSW1.15 MDI Active Selection 0=Record Mode 1=Direct Mode	POS_ZSW1.14 Setup Active	POS_ZSW1.13 Position Record Task Is Active	Reserved B12	POS_ZSW1.11 Homing Task Is Active	POS_ZSW1.10 Jogging Task Is Active	POS_ZSW1.9 Positive Hardware Limit Switch Is Activated	POS_ZSW1.8 Negative Hardware Limit Switch Is Activated	Reserved B7	POS_ZSW1.6 Position Record Selected Bit 6	POS_ZSW1.5 Position Record Selected Bit 5	POS_ZSW1.4 Position Record Selected Bit 4	POS_ZSW1.3 Position Record Selected Bit 3	POS_ZSW1.2 Position Record Selected Bit 2	POS_ZSW1.1 Position Record Selected Bit 1	POS_ZSW1.0 Position Record Selected Bit 0	
	WORD2	POS_ZSW2 or Epos_ZSW2	POS_ZSW2.15 Traversing Task Is Active	POS_ZSW2.14 Fixed Stop Move Is Active	POS_ZSW2.13 Fixed Stop Clamping Torque Reached	POS_ZSW2.12 Fixed Stop Stroke Reached	POS_ZSW2.11 Direct Output 2 Via Positioning Record	POS_ZSW2.10 Direct Output 1 Via Positioning Record	POS_ZSW2.9 Position Trigger Switch 1	POS_ZSW2.8 Position Trigger Switch 0	POS_ZSW2.7 Positive Software Limit Switch Is Reached FAS P1.112413070	POS_ZSW2.6 Negative Software Limit Switch Is Reached FAS P1.112413060	POS_ZSW2.5 Axis Is Moving Negative	POS_ZSW2.4 Axis Is Moving Positive	Reserved B3	POS_ZSW2.2 Setpoint Value Reached	POS_ZSW2.1 Velocity Limit Is Active	POS_ZSW2.0 Tracking Mode Is Active	
	WORD3	ZSW2	ZSW2.12-ZSW2.15 Slave Sign-Of-Life				ZSW2.11 Power Stage Active	ZSW2.10 Reserved	ZSW2.9 Reserved	ZSW2.8 Fixed Stop Move Is Active (No Fieldbus Mapping)	ZSW2.7 Device specific	ZSW2.6 Reserved	ZSW2.5 Reserved	ZSW2.4 Reserved	ZSW2.3 Reserved	ZSW2.2 Reserved	ZSW2.1 Reserved	ZSW2.0 Reserved	
	WORD4	MELDW	Reserved B15	Reserved B14	Pulses Enabled	Drive Ready	Controller Enable	Reserved B10	Reserved B9	Speed Setpoint - Actual Deviation Within tolerance	No alarm, thermal overload, power unit	No motor over- temperature alarm	Variable signaling function	Reserved B4	Setpoint(n) < speed threshold value 2	Setpoint(n) < speed threshold value 3	Torque[%]<torque threshold value 2	0 = Ramping Active 1 = Ramping Completed	
	WORD5	XIST_A	Actual Position Value ActPosition FAS P1.128																
	WORD6	XIST_A	Actual Velocity Value ActVelocity																
	WORD7	XIST_B	Active Fault Number ActFault																
	WORD8	XIST_B	Active Warning Number ActWarn																
	WORD9	FAULT_CODE	Not Used																
	WORD10	WARN_CODE																	
	WORD11	Reserved																	
CONTROL	WORD0	STW1	STW1.15 Device specific	STW1.14 Device specific	STW1.13 Device specific	STW1.12 Release Holding Brake ConfigEPOS.15 ReleaseBrake FAS P1.1147120	STW1.11 Home/Reference Task Start	STW1.10 Control By PLC FAS P1.1147100	STW1.9 Jog2 FAS P1.1147090	STW1.8 Jog1 FAS P1.1147080	STW1.7 Fault Acknowledge AckError	STW1.6 Traverse Task Activate ExecuteMode FAS P1.1147061	STW1.5 Intermediate Stop Disable Ramp Stop @ Current Decel Task=NOT Rejected IntermediateStop FAS P1.1147051	STW1.4 Traversing Task Enable Ramp Stop @ 100% Set Decel Task=Rejected CancelTraversing FAS P1.1147041	STW1.3 Enable Operation	STW1.2 Quick Stop When=0 ConfigEPOS.1 FAS P1.1147020	STW1.1 Coast Stop When=0 ConfigEPOS.0 FAS P1.1147010	STW1.0 Power Stage Pulses Enable EnableAxis FAS P1.1147000	
	WORD1	POS_STW1 or Epos_STW1	POS_STW1.15 MDI Selection 0=Record Mode 1=Direct Mode	POS_STW1.14 signal Setup Selected	POS_STW1.13 Reserved	POS_STW1.12 Continuous Position Setpoint Transfer Enable ConfigEPOS.8 FAS P1.112411120	POS_STW1.11 Reserved	POS_STW1.10 and POS_STW1.9 0 = Modulo Position Mode - Shortest Path 1 = Modulo Position Mode - Only Positive Path 2 = Modulo Position Mode - Only Negative Path 3 = Modulo Position Mode - Shortest Path			POS_STW1.8 Direct Mode Absolute Positioning Active	POS_STW1.7 Reserved B7	POS_STW1.6 Position Record Select Bit 6	POS_STW1.5 Position Record Select Bit 5	POS_STW1.4 Position Record Select Bit 4	POS_STW1.3 Position Record Select Bit 3	POS_STW1.2 Position Record Select Bit 2	POS_STW1.1 Position Record Select Bit 1	POS_STW1.0 Position Record Select Bit 0
	WORD2	POS_STW2 or Epos_STW2	POS_STW2.15 Hardware Limits Enable ConfigEPOS.3 FAS=P1.112414150	POS_STW2.14 Software Limits Enable ConfigEPOS.2 FAS=P1.112414140	POS_STW2.13 Reserved	POS_STW2.12 Reserved	POS_STW2.11 Touch Probe Edge 0 = Rising edge 1 = Falling edge ConfigEPOS.4 FAS=P1.112414110	POS_STW2.10 Select Touch Probe 0 = Probe 1 Active 1 = Probe 2 Active ConfigEPOS.5 FAS=P1.112414100	POS_STW2.9 Start Reference Search 0 = positive direction 1 = negative direction	POS_STW2.8 Reference Select 1 = flying Reference 0 = Search Reference	POS_STW2.7 Reserved	POS_STW2.6 Reserved	POS_STW2.5 Jogging 1 = incremental 0 = velocity	POS_STW2.4 Reserved	POS_STW2.3 Reserved	POS_STW2.2 Reference Cam Active ConfigEPOS.6	POS_STW2.1 Set Reference Point	POS_STW2.0 Tracking Mode Active	
	WORD3	STW2	STW2.12- STW2.15 Master Sign-Of-Life				STW2.11 Motor Switchover Completed	STW2.10 Reserved	STW2.9 Global Trigger Command	STW2.8 Travel to Fixed EndStop Enable ConfigEPOS.30 TravelToFixStop FAS P1.1148080	STW2.7 Parking Axis Enable	STW2.6 Reset I-Component	STW2.5 Global Start	STW2.4 DDS Bit 4	STW2.3 DDS Bit 3	STW2.2 DDS Bit 2	STW2.1 DDS Bit 1	STW2.0 DDS Bit 0	
	WORD4	OVERRIDE	Position Velocity Override																
	WORD5	MDI_TARPOS	MDI (Manual Data Input) Position Target Position FAS P1.11280604																
	WORD6	MDI_TARPOS	MDI (Manual Data Input) Velocity Target Velocity FAS P1.11280605																
	WORD7	MDI_VELOCITY	MDI (Manual Data Input) Percent Acceleration OverAcc																
	WORD8	MDI_VELOCITY	MDI (Manual Data Input) Percent Deceleration OverDec																
	WORD9	MDI_ACC																	
	WORD10	MDI_DEC																	
	WORD11	Reserved	Not Used																

Homing Sequence (S44) State Machine

- Below I have shown the state machine from the user manual and there are only 3 process data handshaking bits of importance for the Homing Sequence (S44):
- STW1.11 Reference / Homing Task Start **ExecuteMode (While in Mode 4)**
 - POS_ZSW1.11 Reference / Homing Task is Active **EposZSW1.11**
 - ZSW1.11 Reference / Homing Completed **AxisRef**

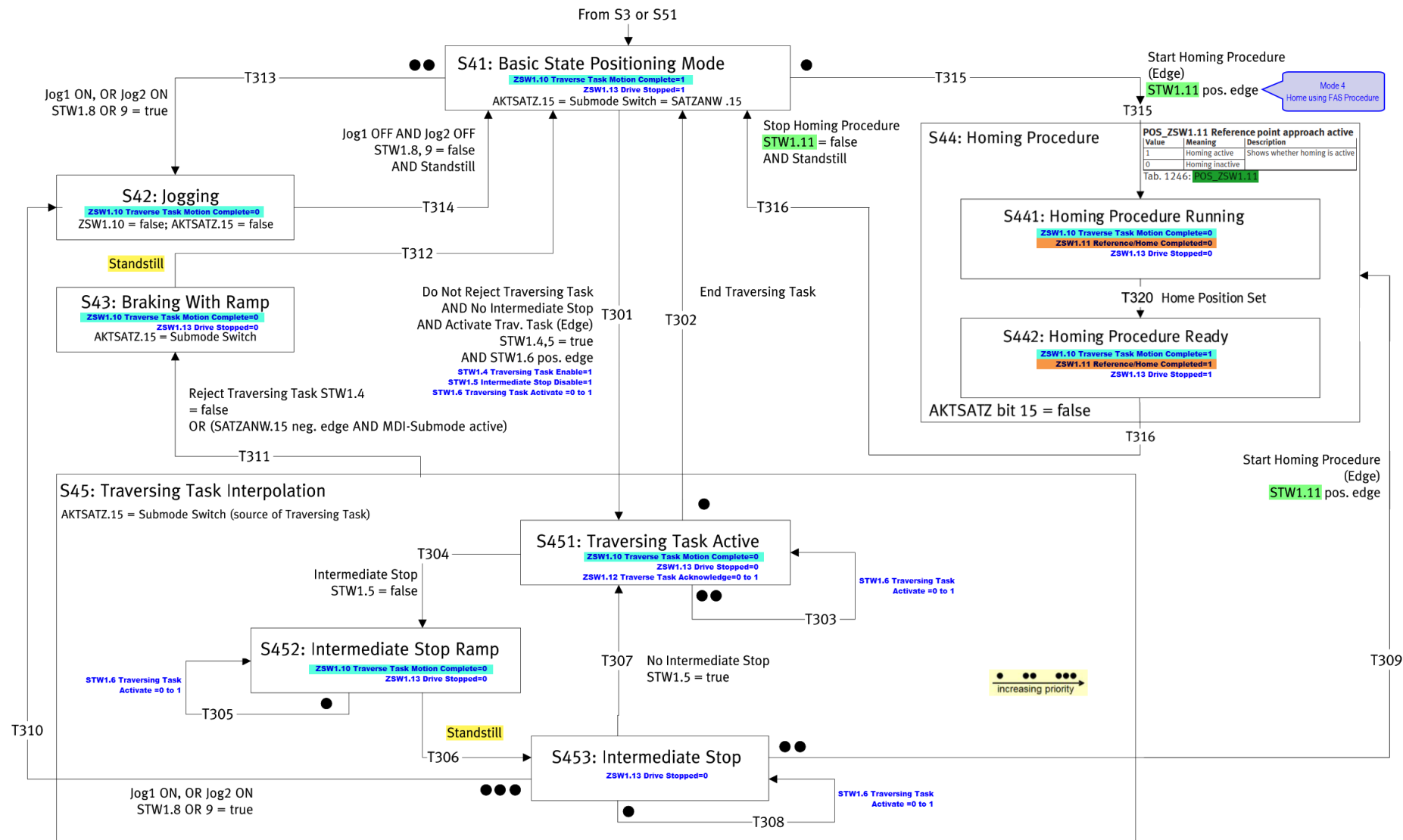
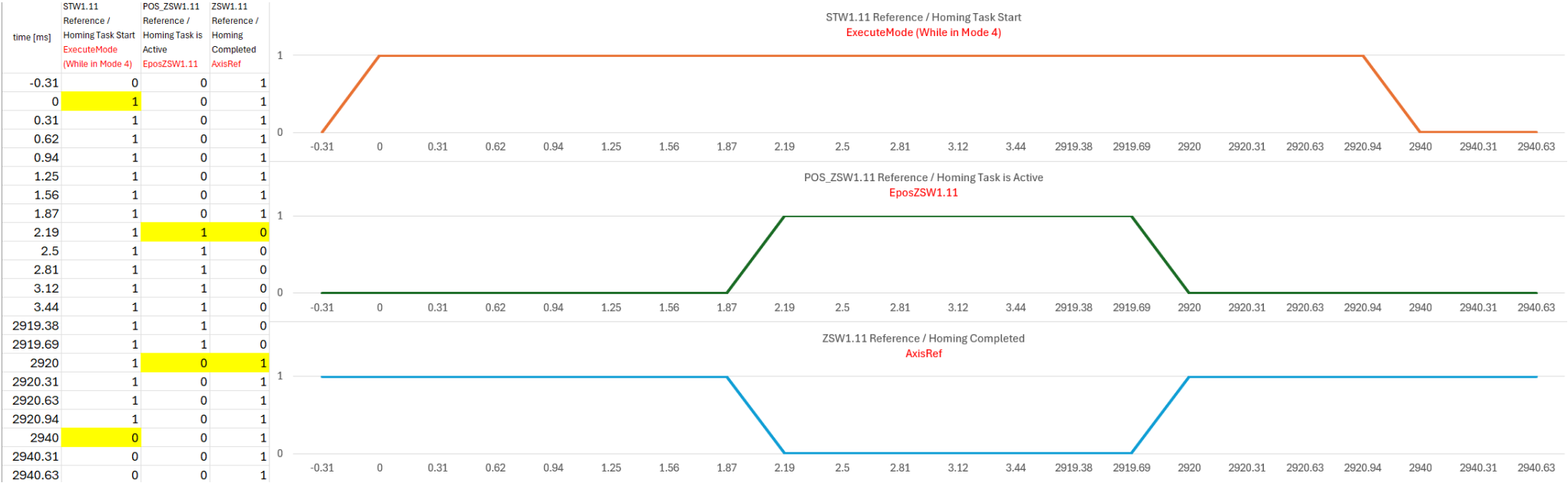


Fig. 170: Finite State Machine Positioning Mode in Application Class 3

Homing Sequence (S44) Programming Sequence

From the state machine the 3 process data handshaking bits should be programmed as shown here. The sequence shown below is extracted from a Festo Automation Suite Trace Recording.



Homing Sequence (S44) Programming Sequence

PLC Output	Value	PLC Input	Value	Description
		AxisEnabled	1	Axis Enabled
		Lockout	0	Switch On NOT Inhibited (FAS has released control)
		AxisWarn	0	No Controller Warnings
		AxisError	0	No Controller Errors
		AxisRef	x	ZSW1.11 Reference / Homing Completed
ModePos	4			Mode Select = Home using Festo Automation Suite Configured Routine
ExecuteMode	1			Homing Task Activate (Rising Edge) While in Mode 4, the ExecuteMode sets/resets STW1.11 Reference / Homing Task Start
		ActMode	4	Mode Selected = Home using Festo Automation Suite Configured Routine NOTE: optional and only reflects ModePos status after Homing has started
		EposZSW1.11	1	POS_ZSW1.11 Reference / Homing Task is Active
		AxisRef	0	ZSW1.11 Reference / Homing Completed
				The Homing Sequence is now Executing
		AxisRef	1	ZSW1.11 Reference / Homing Completed
ExecuteMode	0			Homing Task De-Activate While in Mode 4, the ExecuteMode sets/resets STW1.11 Reference / Homing Task Start
		EposZSW1.11	0	POS_ZSW1.11 Reference / Homing Task is Active
				The Homing Sequence is now Complete

Homing Sequence (S44) Rockwell PLC Programming Sequence

The ladder logic below shows an example of a simple routine to execute the Homing Sequence (S44)

