SortingStation

PLC_1 [CPU 1511-1 PN]

PLC_1			
General\Project information			
Name	PLC_1	**Author**	i72014
Comment		**Rack**	0
Slot	1		
General\Catalog information			
Short designation	CPU 1511-1 PN	**Description**	CPU with display; work memory 150 KB code and 1 MB data; 60 ns bit operation time; 4-stage protection concept, integrated technology functions: Motion Control, closed-loop control, counting&measuring; integrated tracing; PROFINET IO controller, supports RT/IRT, 2 ports, MRP, transport protocol TCP/IP, S7 communication, Web server, constant bus cycle time, routing; firmware V1.8
Article number	6ES7 511-1AK00-0AB0	**Firmware version**	V1.8
	False		
General\Identification & Maintenance			
Plant designation		**Location identifier**	
Installation date	2016-04-07 13:20:53.143	**Additional information**	

Connection resources

	Station resources - Reserved - Maximum	Station resources - Reserved - Configured	Station resources - Dynamic - Configured	Module resources - PLC_1 [CPU 1511-1 PN] - Configured
Maximum number of resources:		10	54	64
	Maximum	Configured	Configured	Configured
PG communication:	4	-	-	-
HMI communication:	4	2	0	2
S7 communication:	0	-	0	0
Open user communication:	0	-	0	0
Web communication:	2	-	-	-
Other communication:	-	-	0	0
Total resources used:		2	0	2
Available resources:		8	54	62

Overview of addresses\Overview of addresses\Overview of addresses			
Inputs	True	**Outputs**	True
Address gaps	False	**Slot**	True

Type	I	**Addr. from**	0	**Addr. to**	15	**Module**	AI 8xU/I/RTD/TC ST_1
PIP	None	**OB**	-	**Device name**	PLC_1 [CPU 1511-1 PN]	**Device number**	-
Size	16 Bytes	**Master / IO system**	-	**Rack**	0	**Slot**	2
Type	I	**Addr. from**	16	**Addr. to**	31	**Module**	AI 8xU/I/RTD/TC ST_2
PIP	None	**OB**	-	**Device name**	PLC_1 [CPU 1511-1 PN]	**Device number**	-
Size	16 Bytes	**Master / IO system**	-	**Rack**	0	**Slot**	3
Type	I	**Addr. from**	32	**Addr. to**	47	**Module**	AI 8xU/I/RTD/TC ST_3
PIP	None	**OB**	-	**Device name**	PLC_1 [CPU 1511-1 PN]	**Device number**	-
Size	16 Bytes	**Master / IO system**	-	**Rack**	0	**Slot**	4
Type	I	**Addr. from**	48	**Addr. to**	63	**Module**	AI 8xU/I/RTD/TC ST_4
PIP	None	**OB**	-	**Device name**	PLC_1 [CPU 1511-1 PN]	**Device number**	-
Size	16 Bytes	**Master / IO system**	-	**Rack**	0	**Slot**	5
Type	I	**Addr. from**	512	**Addr. to**	513	**Module**	DI 16x24VDC BA_1
PIP	None	**OB**	-	**Device name**	PLC_1 [CPU 1511-1 PN]	**Device number**	-
Size	2 Bytes	**Master / IO system**	-	**Rack**	0	**Slot**	6

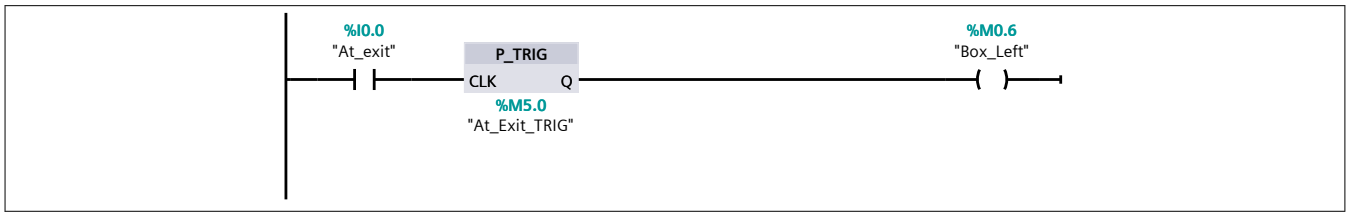
PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

ExitSensor [FB8]

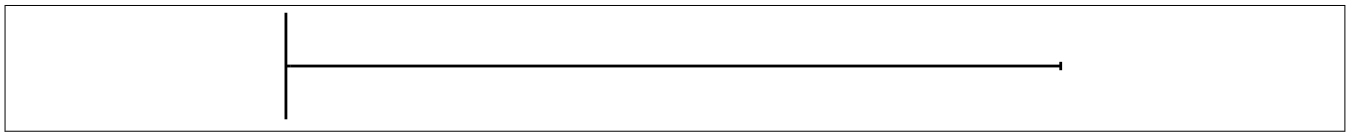
ExitSensor Properties					
General					
Name	ExitSensor	**Number**	8	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

Network 1: Box left memory bit to trigger the reset of stop blade



Network 2:



PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

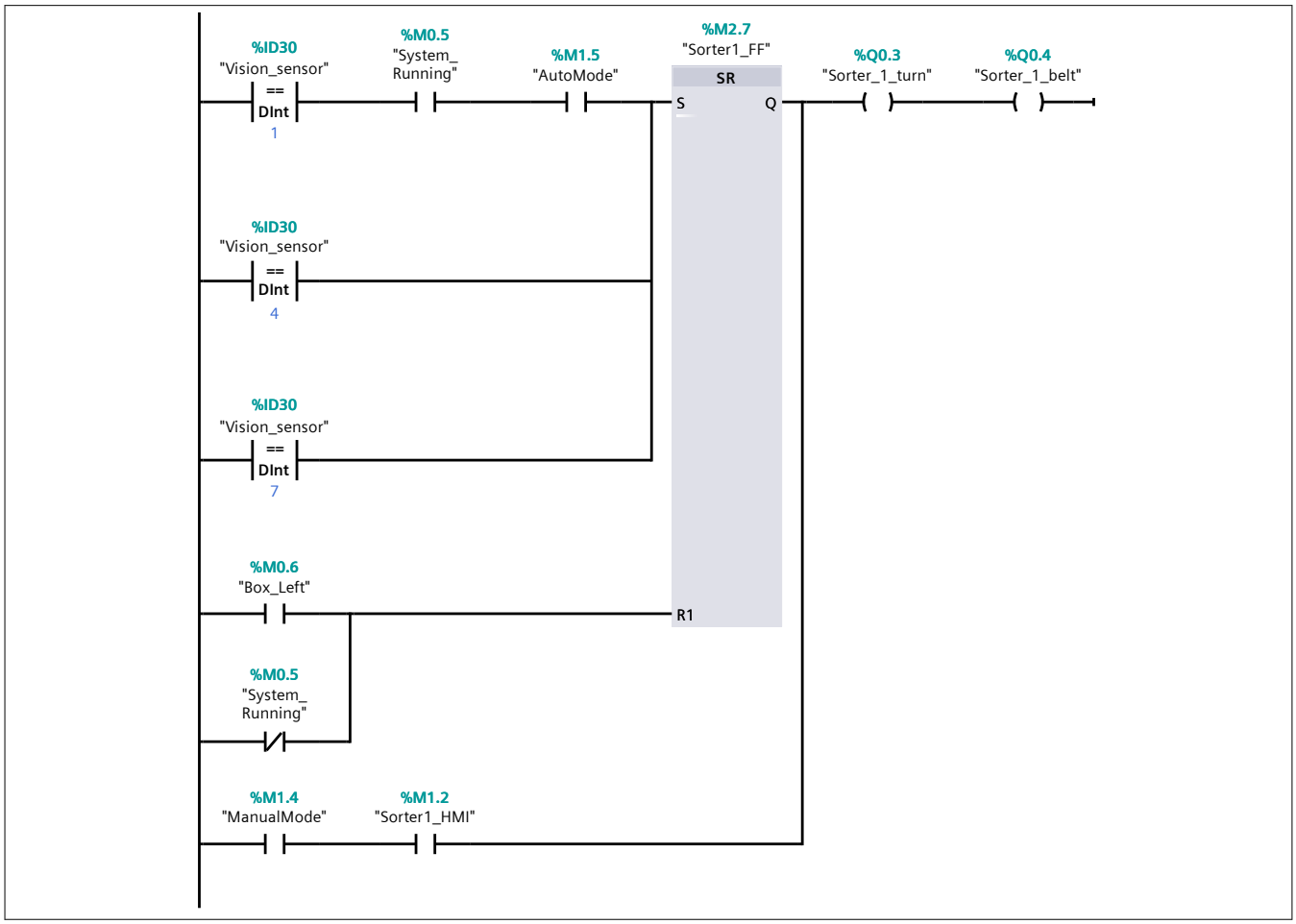
Sorters [FB2]

Sorters Properties					
General					
Name	Sorters	**Number**	2	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

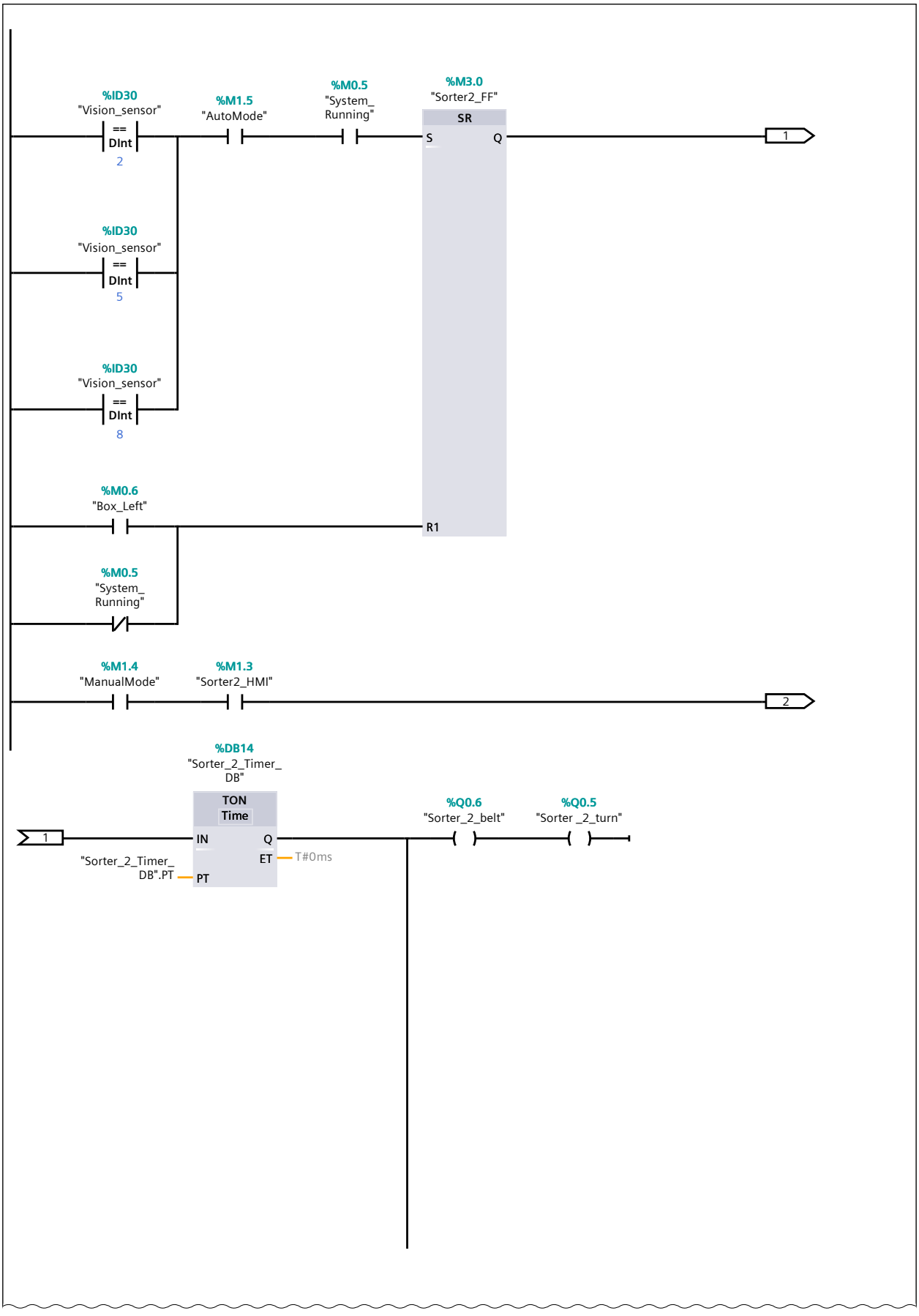
Network 1: Sorter 1 logic

Sorter 1 Auto



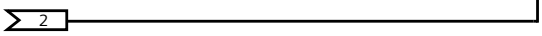
Network 2: Sorter 2 logic

Network 2: Sorter 2 logic (1.1 / 2.1)



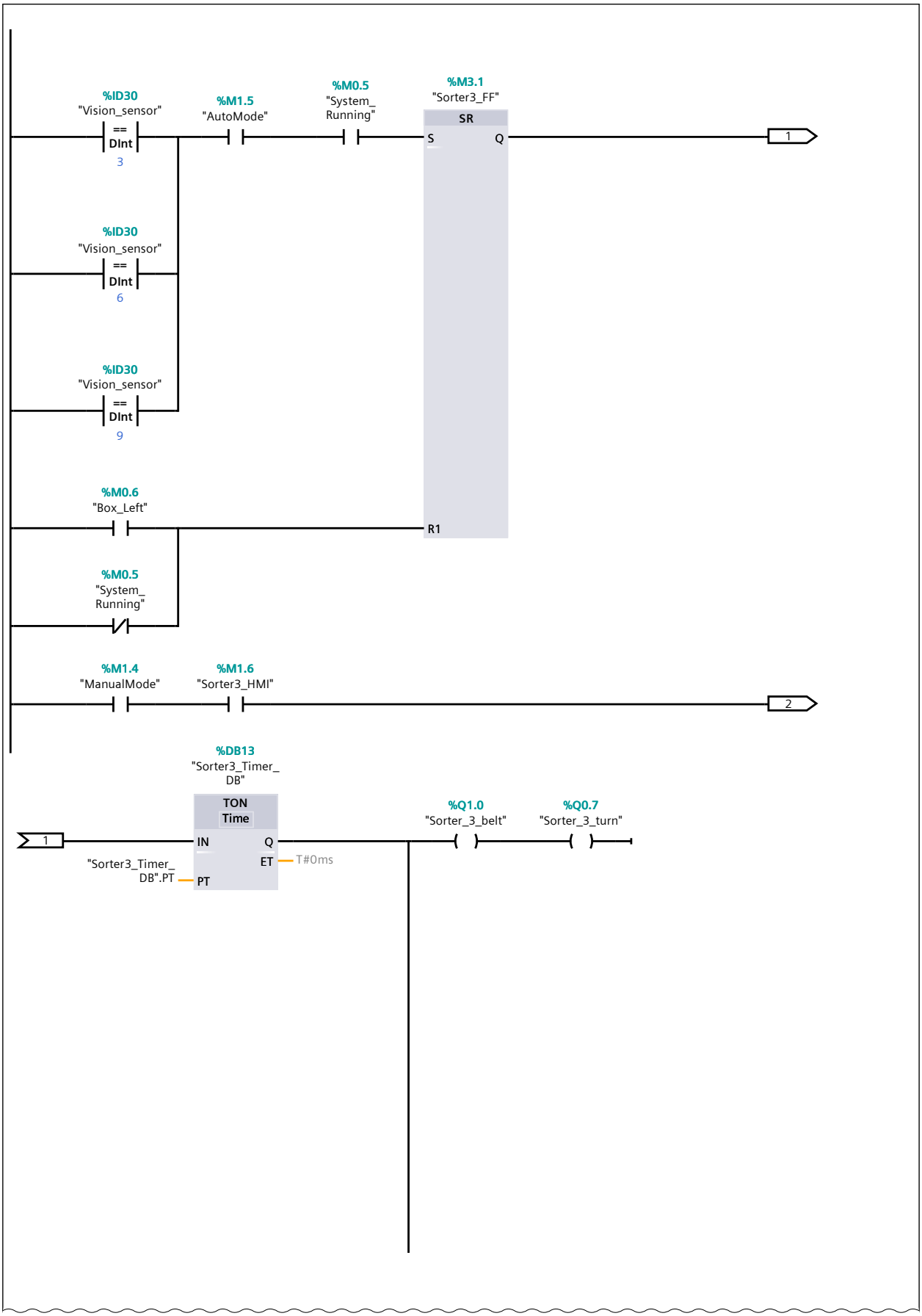
Network 2: Sorter 2 logic (2.1 / 2.1)

1.1 (Page4 - 2)



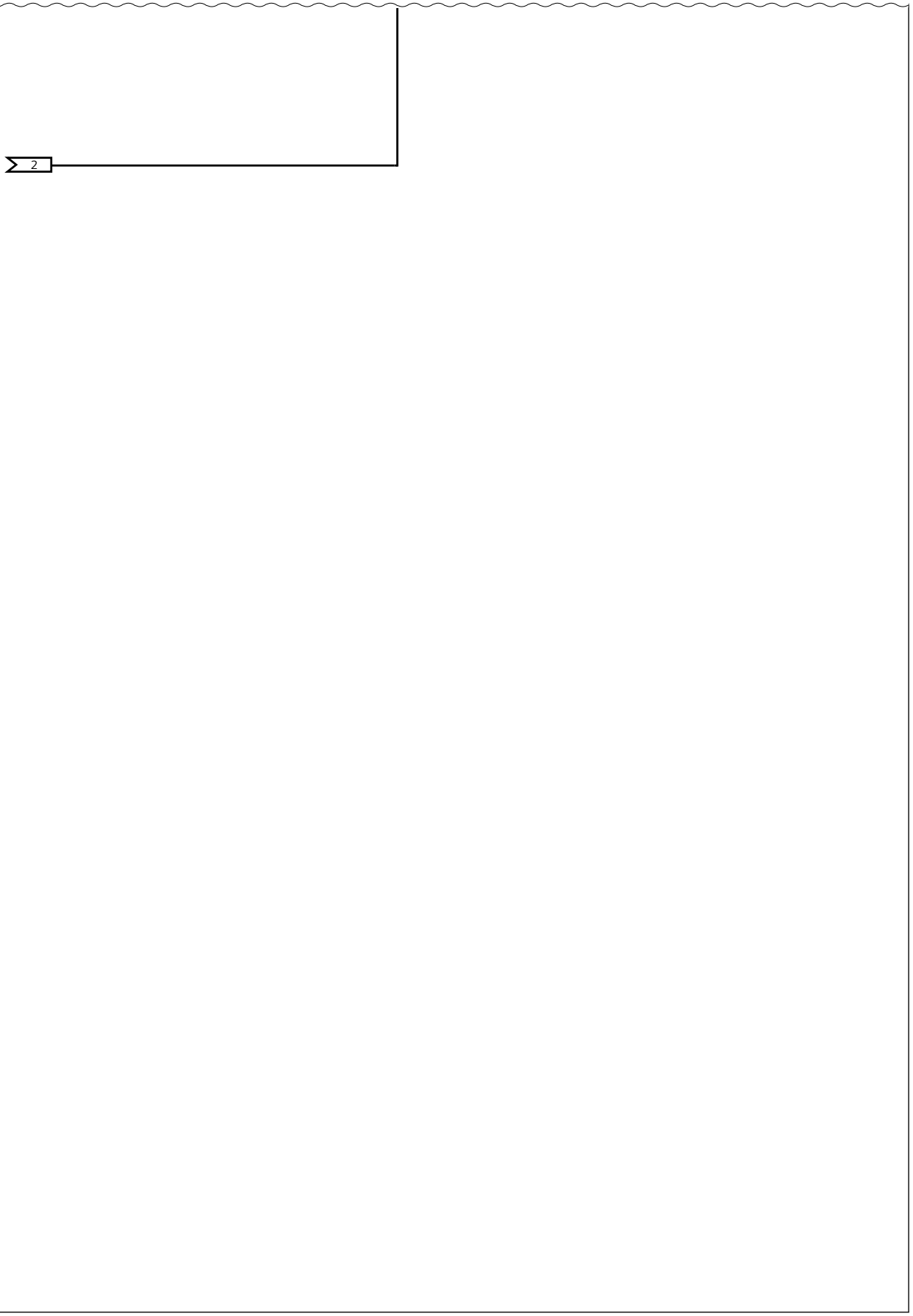
Network 3: Sorter 3 Logic

Network 3: Sorter 3 Logic (1.1 / 2.1)



Network 3: Sorter 3 Logic (2.1 / 2.1)

1.1 (Page4 - 5)



PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

ExitSensor_DB [DB12]

ExitSensor_DB Properties					
General					
Name	ExitSensor_DB	**Number**	12	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

Sorters_DB_1 [DB8]

Sorters_DB_1 Properties					
General					
Name	Sorters_DB_1	**Number**	8	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

Sorter_2_Timer_DB [DB14]

Sorter_2_Timer_DB Properties					
General					
Name	Sorter_2_Timer_DB	**Number**	14	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	IEC_TMR

Name	Data type	Start value	Retain
▼ Static			
PT	Time	T#2.5s	False
ET	Time	T#0ms	False
IN	Bool	false	False
Q	Bool	false	False

PLC_1 [CPU 1511-1 PN] / Program blocks / Sorters

Sorter3_Timer_DB [DB13]

Sorter3_Timer_DB Properties					
General					
Name	Sorter3_Timer_DB	**Number**	13	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	IEC_TMR

Name	Data type	Start value	Retain
▼ Static			
PT	Time	T#4.5s	False
ET	Time	T#0ms	False
IN	Bool	false	False
Q	Bool	false	False

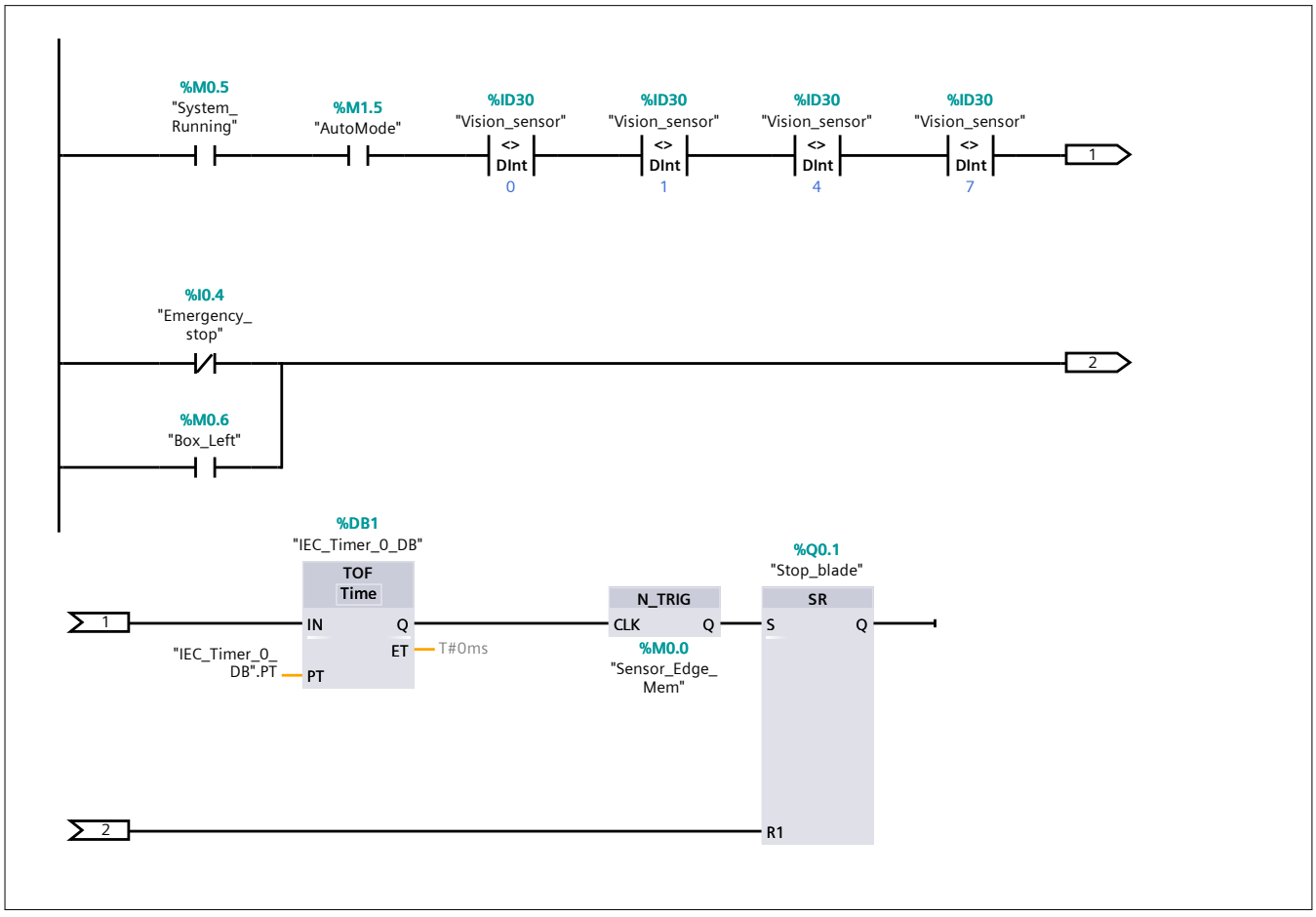
PLC_1 [CPU 1511-1 PN] / Program blocks / Conveyors

Stopblade [FB5]

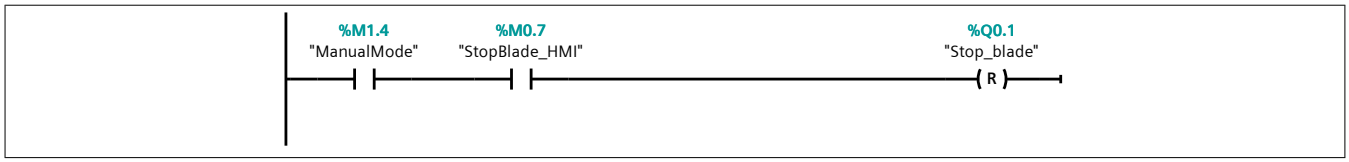
Stopblade Properties					
General					
Name	Stopblade	**Number**	5	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

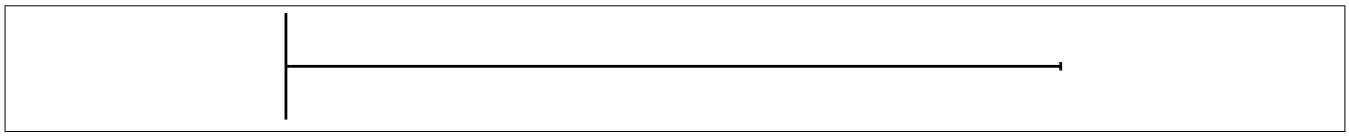
Network 1: Auto Mode Stop Blade



Network 2: Manual Mode Stop blade



Network 3:



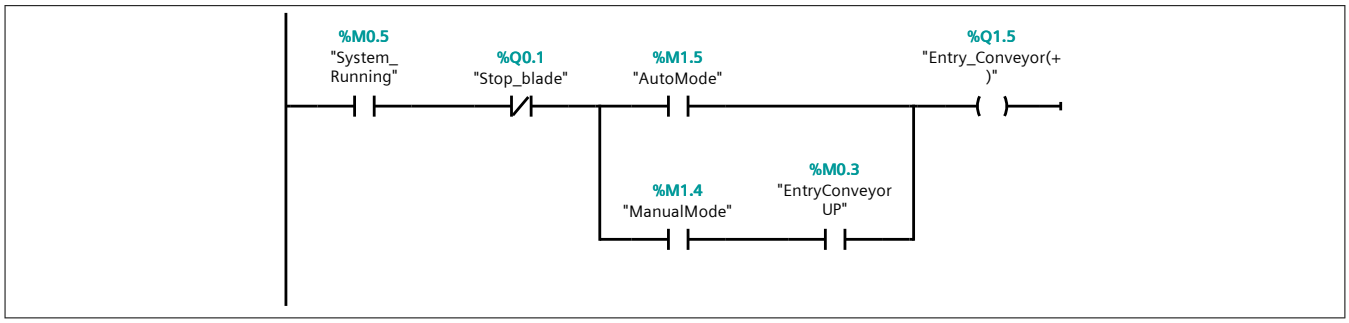
PLC_1 [CPU 1511-1 PN] / Program blocks / Conveyors

Entry/ExitConveyor [FB6]

Entry/ExitConveyor Properties					
General					
Name	Entry/ExitConveyor	**Number**	6	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

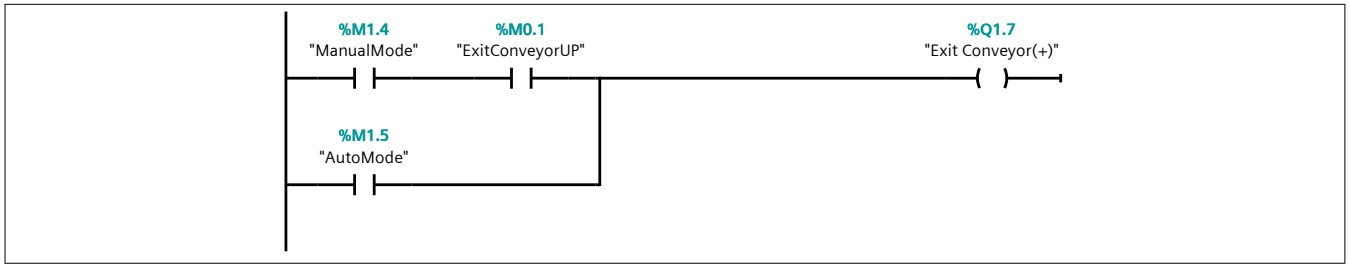
Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

Network 1: Auto Mode Conveyor control



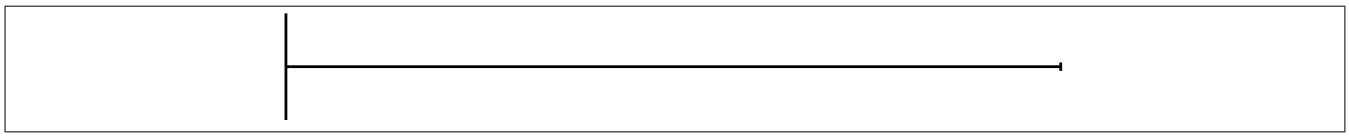
Network 2: Manual Mode Entry Conveyor control (-)

Network 3: Manual Mode Exit Conveyor control (+)

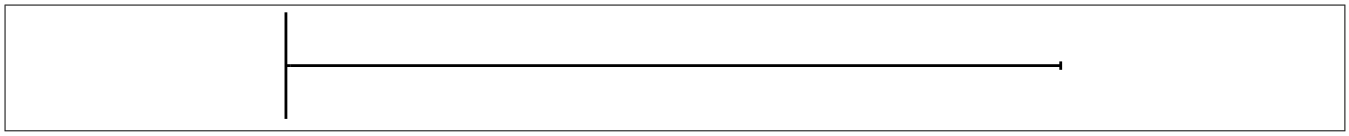


Network 4: Manual Mode Exit Conveyor control (-)

Network 5:



Network 6:



PLC_1 [CPU 1511-1 PN] / Program blocks / Conveyors

IEC_Timer_0_DB [DB1]

IEC_Timer_0_DB Properties					
General					
Name	IEC_Timer_0_DB	**Number**	1	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	IEC_TMR

Name	Data type	Start value	Retain
▼ Static			
PT	Time	T#250MS	False
ET	Time	T#0ms	False
IN	Bool	false	False
Q	Bool	false	False

PLC_1 [CPU 1511-1 PN] / Program blocks / Conveyors

Entry/ExitConveyor_DB [DB2]

Entry/ExitConveyor_DB Properties					
General					
Name	Entry/ExitConveyor_DB	**Number**	2	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

PLC_1 [CPU 1511-1 PN] / Program blocks / Conveyors

Stopblade_DB [DB4]

Stopblade_DB Properties					
General					
Name	Stopblade_DB	**Number**	4	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

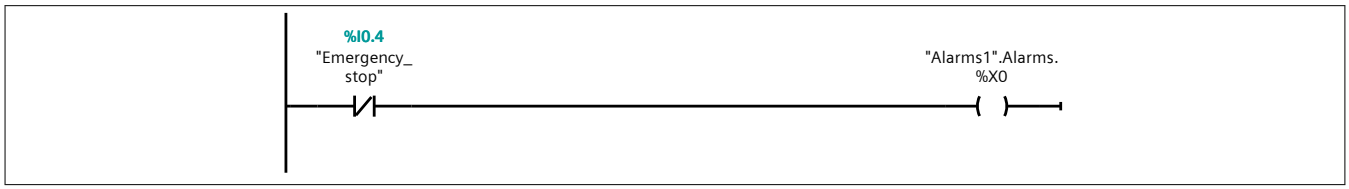
PLC_1 [CPU 1511-1 PN] / Program blocks / Alarms

E-Stop_Alarm [FB9]

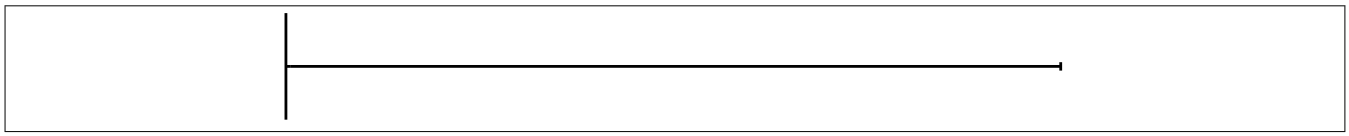
E-Stop_Alarm Properties					
General					
Name	E-Stop_Alarm	**Number**	9	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

Network 1: Emergency Stop Alarm



Network 2:



PLC_1 [CPU 1511-1 PN] / Program blocks / Alarms

Alarms1 [DB5]

Alarms1 Properties					
General					
Name	Alarms1	**Number**	5	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
▼ Static			
Alarms	Int	0	False

PLC_1 [CPU 1511-1 PN] / Program blocks / Alarms

Alarms_DB_1 [DB9]

Alarms_DB_1 Properties					
General					
Name	Alarms_DB_1	**Number**	9	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

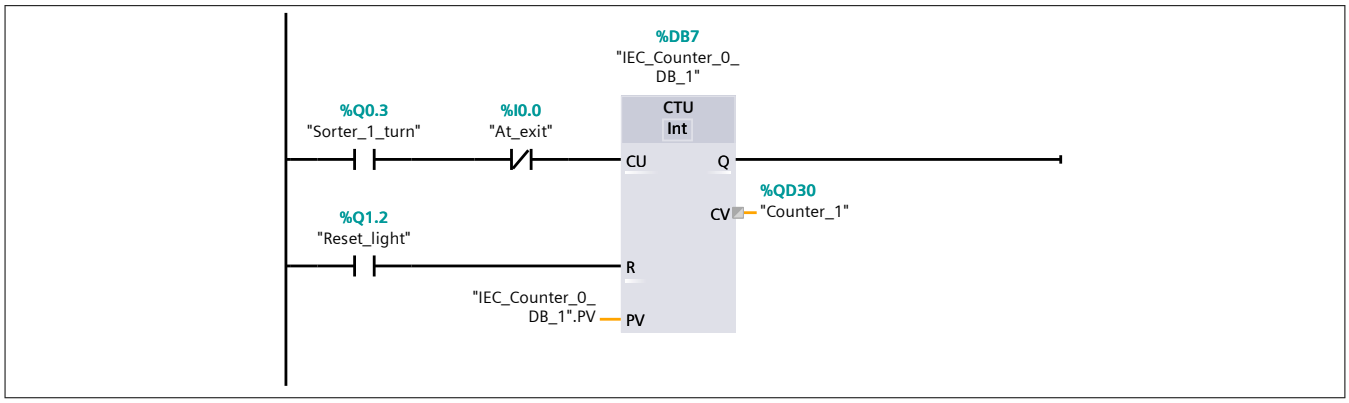
PLC_1 [CPU 1511-1 PN] / Program blocks / Counters

Counters [FB7]

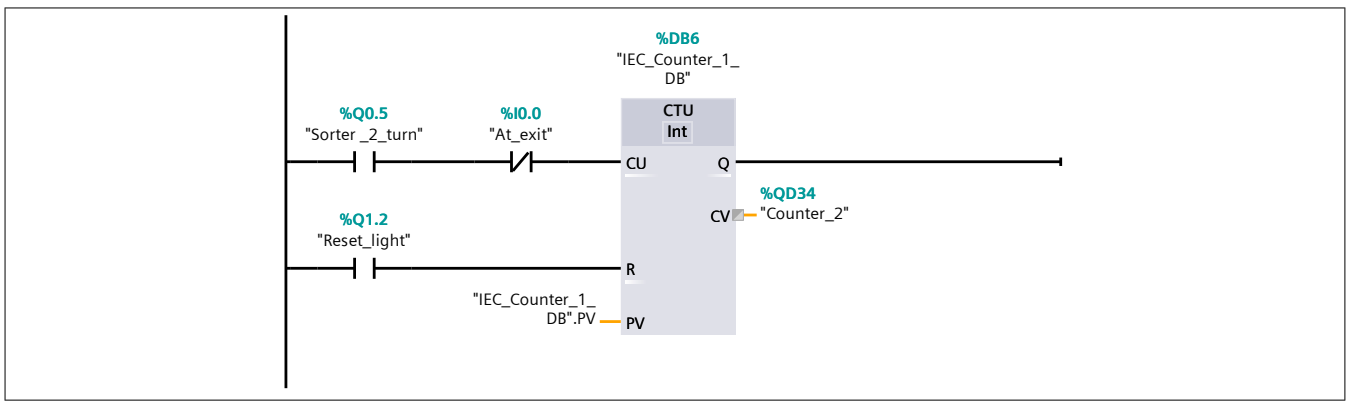
Counters Properties					
General					
Name	Counters	**Number**	7	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
Static			
Temp			
Constant			

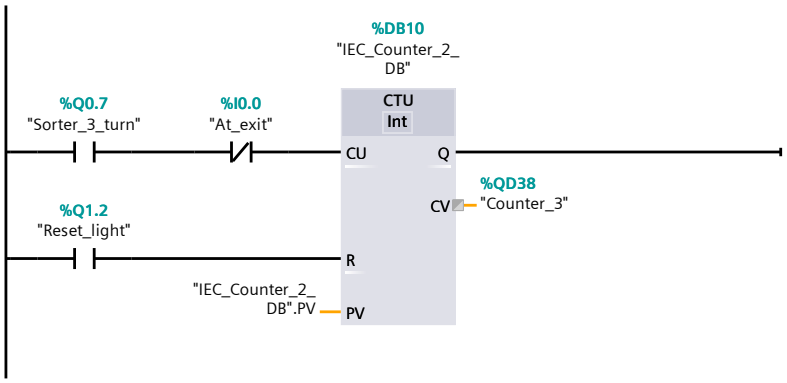
Network 1: Counter 1 for products leaving Exit conveyor through sorter 1



Network 2: Counter 2 for products leaving Exit conveyor through sorter 2



Network 3: Counter 3 for products leaving Exit conveyor through sorter 3


%DB10
"IEC_Counter_2_
DB"
%Q0.7
"Sorter_3_turn"
%I0.0
"At_exit"
CTU
Int
CU
Q
%QD38
CV
"Counter_3"
%Q1.2
"Reset_light"
R
"IEC_Counter_2_
DB".PV
PV

PLC_1 [CPU 1511-1 PN] / Program blocks / Counters

IEC_Counter_1_DB [DB6]

IEC_Counter_1_DB Properties					
General					
Name	IEC_Counter_1_DB	**Number**	6	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	CNTR

Name	Data type	Start value	Retain
▼ Static			
CU	Bool	false	True
CD	Bool	false	True
R	Bool	false	True
LD	Bool	false	True
QU	Bool	false	True
QD	Bool	false	True
PV	Int	100	True
CV	Int	0	True

PLC_1 [CPU 1511-1 PN] / Program blocks / Counters

IEC_Counter_0_DB_1 [DB7]

IEC_Counter_0_DB_1 Properties					
General					
Name	IEC_Counter_0_DB_1	**Number**	7	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	CNTR

Name	Data type	Start value	Retain
▼ Static			
CU	Bool	false	True
CD	Bool	false	True
R	Bool	false	True
LD	Bool	false	True
QU	Bool	false	True
QD	Bool	false	True
PV	Int	100	True
CV	Int	0	True

PLC_1 [CPU 1511-1 PN] / Program blocks / Counters

IEC_Counter_2_DB [DB10]

IEC_Counter_2_DB Properties					
General					
Name	IEC_Counter_2_DB	**Number**	10	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	CNTR

Name	Data type	Start value	Retain
▼ Static			
CU	Bool	false	True
CD	Bool	false	True
R	Bool	false	True
LD	Bool	false	True
QU	Bool	false	True
QD	Bool	false	True
PV	Int	100	True
CV	Int	0	True

PLC_1 [CPU 1511-1 PN] / Program blocks / Counters

Counters_DB [DB11]

Counters_DB Properties					
General					
Name	Counters_DB	**Number**	11	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
Static			

PLC_1 [CPU 1511-1 PN] / Program blocks / Common

MHJ-PLC-Lab-Function-S71500 [FC9000]

MHJ-PLC-Lab-Function-S71500 Properties					
General					
Name	MHJ-PLC-Lab-Function-S71500	**Number**	9000	**Type**	FC
Language	SCL	**Numbering**	Manual		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value
Input		
Output		
InOut		
▼ Temp		
Value	Byte	
ForCounter	Int	
▼ Constant		
Value_01_DW	DWord	16#1223_5486
Value_02_DW	DWord	16#A6C9_D1F5
▼ Return		
MHJ-PLC-Lab-Function-S71500	Void	

```
0001
0002 #Value:=PEEK(area := 16#82,
0003    dbNumber := 0,
0004    byteOffset := 511);
0005 #Value := #Value + 1;
0006
0007 POKE(area := 16#82,
0008    dbNumber := 0,
0009    byteOffset := 511,
0010    value := #Value);
0011
0012 POKE(area := 16#82,
0013    dbNumber := 0,
0014    byteOffset := 1016,
0015    value := #Value_01_DW);
0016 POKE(area := 16#82,
0017    dbNumber := 0,
0018    byteOffset := 1020,
0019    value := #Value_02_DW);
0020
0021 FOR #ForCounter := 0 TO 63 DO
0022   #Value:=PEEK(area := 16#1,
0023      dbNumber := 0,
0024      byteOffset := #ForCounter);
0025   POKE(area := 16#81,
0026      dbNumber := 0,
0027      byteOffset := #ForCounter,
0028      value := #Value);
0029 END_FOR;
```

```
0030 #Value := PEEK(area := 16#1,
0031           dbNumber := 0,
0032           byteOffset := 512);
0033 POKE(area := 16#82,
0034    dbNumber := 0,
0035    byteOffset := 512,
0036    value := #Value);
0037
0038
```

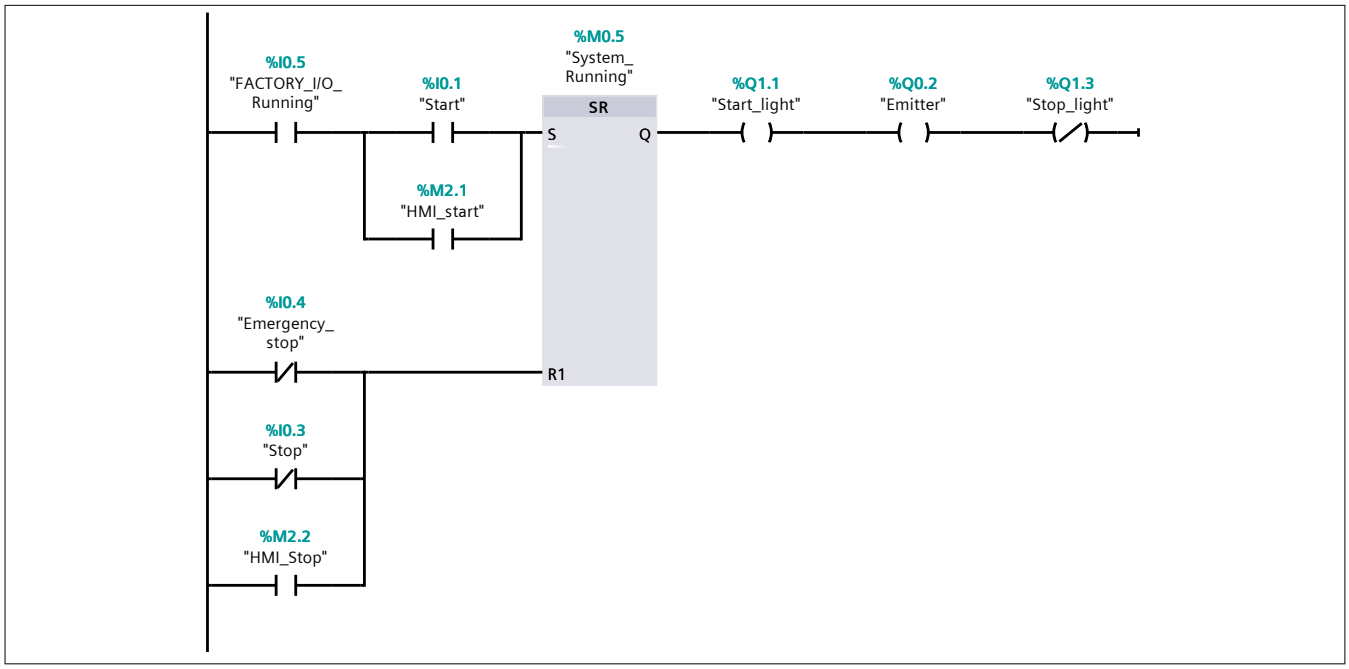
PLC_1 [CPU 1511-1 PN] / Program blocks / Common

Control [FB1]

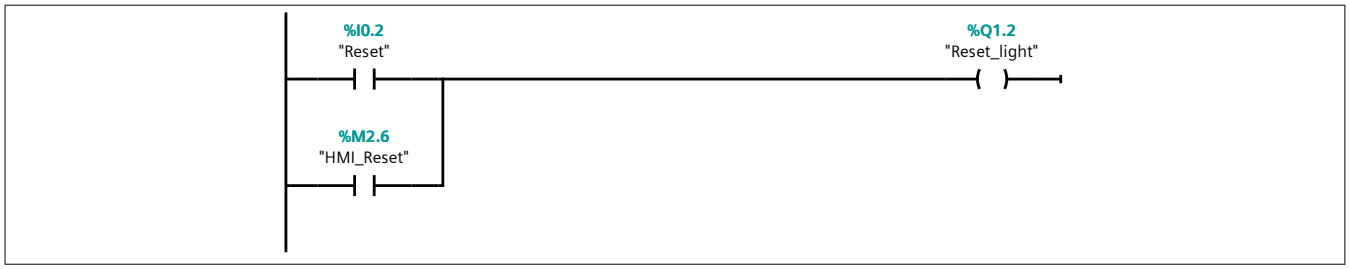
Control Properties					
General					
Name	Control	**Number**	1	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
System Status	Int	0	Non-retain
Temp			
Constant			

Network 1: Control main logic

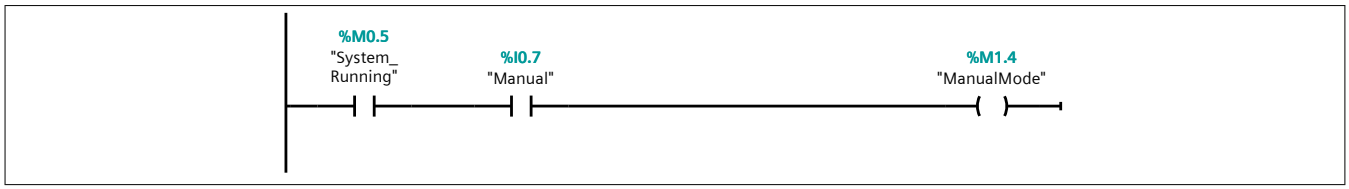


Network 2: Reset button Logic



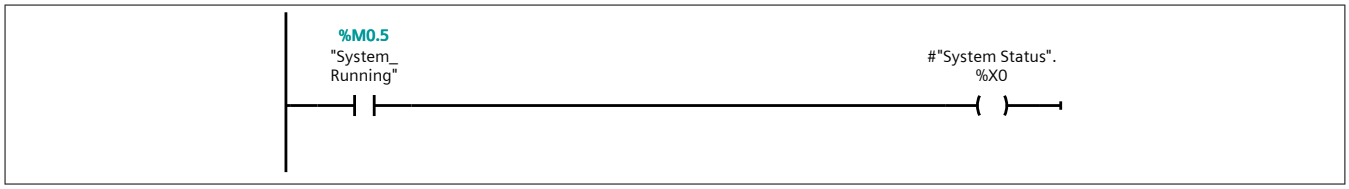
Network 3: Auto mode

Network 4: Manual mode

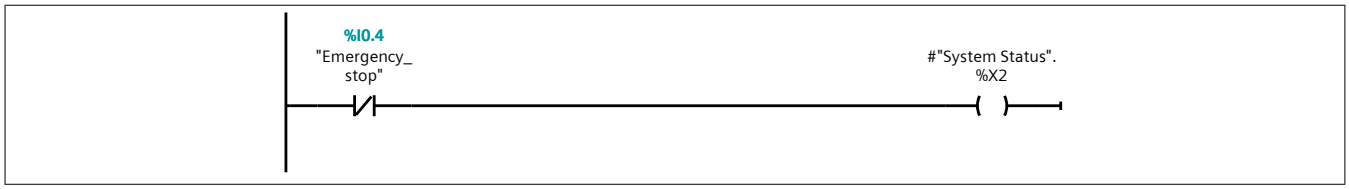


Network 5: System status LED HMI (System not started)

Network 6: System status LED HMI (System started)



Network 7: System status LED HMI (Estop)



PLC_1 [CPU 1511-1 PN] / Program blocks / Common

Control_DB [DB3]

Control_DB Properties					
General					
Name	Control_DB	**Number**	3	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
System Status	Int	0	False

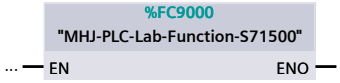
PLC_1 [CPU 1511-1 PN] / Program blocks / OB

Main [OB1]

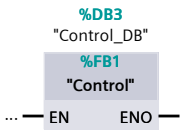
Main Properties					
General					
Name	Main	**Number**	1	**Type**	OB
Language	FBD	**Numbering**	Automatic		
Information					
Title	"Main Program Sweep (Cycle)"	**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

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

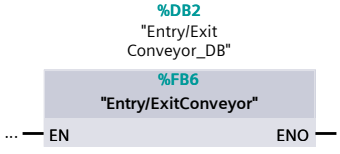
Network 1:



Network 2:



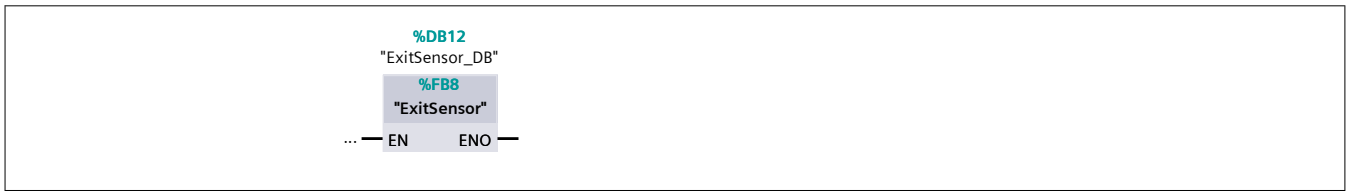
Network 3:



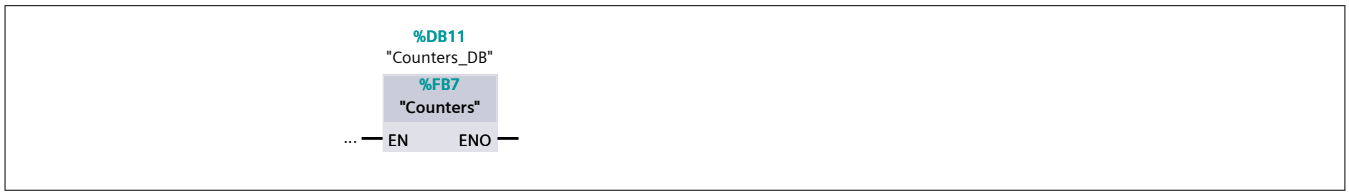
Network 4:

Network 5:

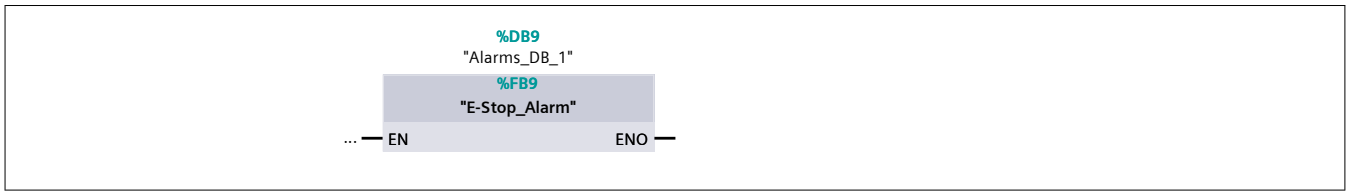
Network 6:



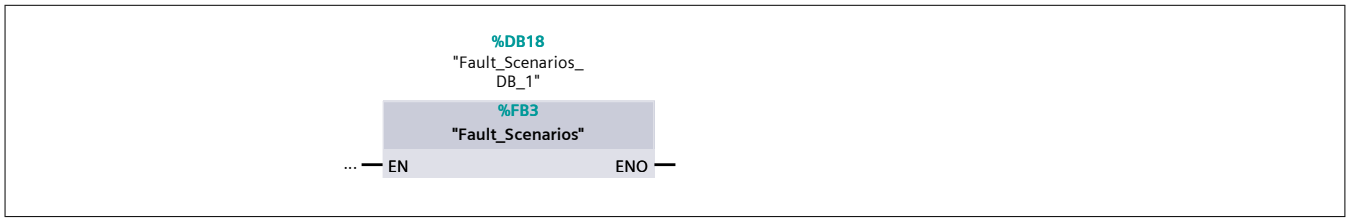
Network 7:



Network 8:



Network 9:



PLC_1 [CPU 1511-1 PN] / Program blocks / Fault_Scenarios

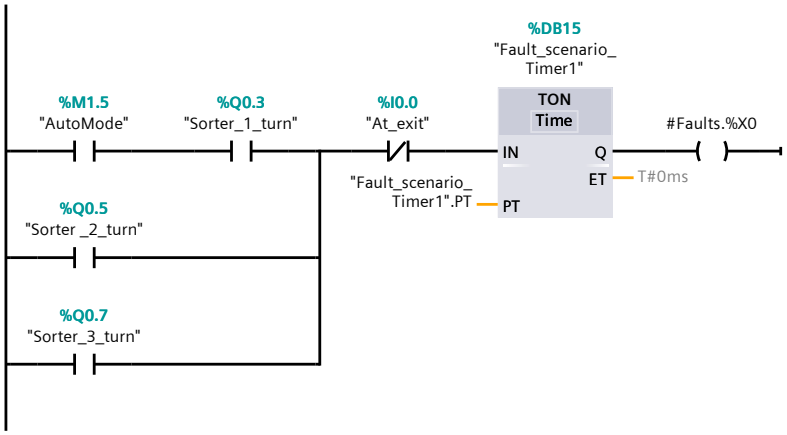
Fault_Scenarios [FB3]

Fault_Scenarios Properties					
General					
Name	Fault_Scenarios	**Number**	3	**Type**	FB
Language	LAD	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Default value	Retain
Input			
Output			
InOut			
▼ Static			
Faults	Int	0	Non-retain
Temp			
Constant			

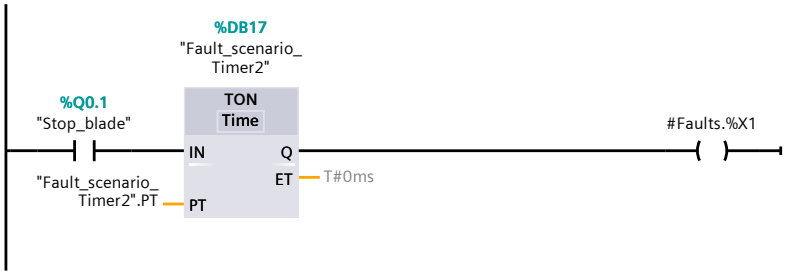
Network 1: Sorter Failure Scenario

If sorter is on and the at exit sensor doesn't trigger in a specified time,



Network 2: Stuck Stop Blade

Stop blade stuck



PLC_1 [CPU 1511-1 PN] / Program blocks / Fault_Scenarios

Fault_scenario_Timer1 [DB15]

Fault_scenario_Timer1 Properties					
General					
Name	Fault_scenario_Timer1	**Number**	15	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	IEC_TMR

Name	Data type	Start value	Retain
▼ Static			
PT	Time	T#7s	False
ET	Time	T#0ms	False
IN	Bool	false	False
Q	Bool	false	False

PLC_1 [CPU 1511-1 PN] / Program blocks / Fault_Scenarios

Fault_scenario_Timer2 [DB17]

Fault_scenario_Timer2 Properties					
General					
Name	Fault_scenario_Timer2	**Number**	17	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**	Simatic	**Comment**	
Family	IEC	**Version**	1.0	**User-defined ID**	IEC_TMR

Name	Data type	Start value	Retain
▼ Static			
PT	Time	T#13ms	False
ET	Time	T#0ms	False
IN	Bool	false	False
Q	Bool	false	False

PLC_1 [CPU 1511-1 PN] / Program blocks / Fault_Scenarios

Fault_Scenarios_DB_1 [DB18]

Fault_Scenarios_DB_1 Properties					
General					
Name	Fault_Scenarios_DB_1	**Number**	18	**Type**	DB
Language	DB	**Numbering**	Automatic		
Information					
Title		**Author**		**Comment**	
Family		**Version**	0.1	**User-defined ID**	

Name	Data type	Start value	Retain
Input			
Output			
InOut			
▼ Static			
Faults	Int	0	False

PLC_1 [CPU 1511-1 PN]

Technology objects

This folder is empty.

PLC_1 [CPU 1511-1 PN] / PLC tags / Tagtable [102]

PLC tags

PLC tags				
	Name	Data type	Address	Retain
	At_exit	Bool	%I0.0	False
	Start	Bool	%I0.1	False
	Reset	Bool	%I0.2	False
	Stop	Bool	%I0.3	False
	Emergency_stop	Bool	%I0.4	False
	FACTORY_I/O_Running	Bool	%I0.5	False
	Vision_sensor	DInt	%ID30	False
	Auto	Bool	%I0.6	False
	Manual	Bool	%I0.7	False
	Exit Conveyor(+)	Bool	%Q1.7	False
	Stop_blade	Bool	%Q0.1	False
	Exit_conveyor(-)	Bool	%Q1.6	False
	Sorter_1_turn	Bool	%Q0.3	False
	Sorter_1_belt	Bool	%Q0.4	False
	Sorter _2_turn	Bool	%Q0.5	False
	Sorter_2_belt	Bool	%Q0.6	False
	Sorter_3_turn	Bool	%Q0.7	False
	Sorter_3_belt	Bool	%Q1.0	False
	Start_light	Bool	%Q1.1	False
	Reset_light	Bool	%Q1.2	False
	Stop_light	Bool	%Q1.3	False
	Counter_1	DInt	%QD30	False
	Counter_2	DInt	%QD34	False
	Counter_3	DInt	%QD38	False
	Emitter	Bool	%Q0.2	False
	Entry_Conveyor(+)	Bool	%Q1.5	False
	Entry_Conveyor(-)	Bool	%Q1.4	False
	Sensor_Edge_Mem	Bool	%M0.0	False
	System_Running	Bool	%M0.5	False
	Box_Left	Bool	%M0.6	False
	ManualMode	Bool	%M1.4	False
	AutoMode	Bool	%M1.5	False
	Alarm	Int	%MW0	False
	At_Exit_TRIG	Bool	%M5.0	False
	ExitConveyorUP	Bool	%M0.1	False
	ExitConveyorDown	Bool	%M0.2	False
	EntryConveyorUP	Bool	%M0.3	False

	Name	Data type	Address	Retain
	EntryConveyorDown	Bool	%M0.4	False
	StopBlade_HMI	Bool	%M0.7	False
	Sorter1_HMI	Bool	%M1.2	False
	Sorter2_HMI	Bool	%M1.3	False
	Sorter3_HMI	Bool	%M1.6	False
	Safety_OK	Bool	%M2.0	False
	HMI_start	Bool	%M2.1	False
	HMI_Stop	Bool	%M2.2	False
	Sorter3_HMI_Reset	Bool	%M2.3	False
	Sorter1_HMI_Reset	Bool	%M2.4	False
	Sorter2_HMI_Reset	Bool	%M2.5	False
	HMI_Reset	Bool	%M2.6	False
	Sorter1_FF	Bool	%M2.7	False
	Sorter2_FF	Bool	%M3.0	False
	Sorter3_FF	Bool	%M3.1	False