

Main Program [OB1]

Main Program Properties

General

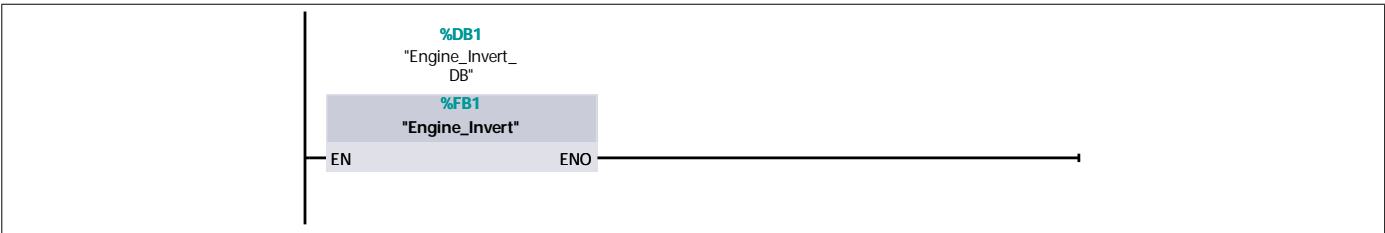
Name	Main Program	Number	1	Type	OB
Language	LAD	Numbering	Manual		

Information

Title	"Main Program Sweep (Cycle)"	Author		Comment	Example 12.7 - Engine Inverter with Structured Text (SCL) Copyright (c) 2022 Dogwood Valley Press, LLC
Family		Version	0.1	User-defined ID	

Name	Data type	Default value
▼ Temp		
OB1_EV_CLASS	Byte	
OB1_SCAN_1	Byte	
OB1_PRIORITY	Byte	
OB1_OB_NUMBR	Byte	
OB1_RESERVED_1	Byte	
OB1_RESERVED_2	Byte	
OB1_PREV_CYCLE	Int	
OB1_MIN_CYCLE	Int	
OB1_MAX_CYCLE	Int	
OB1_DATE_TIME	Date_And_Time	
Temp1	Bool	
Temp2	Bool	
Constant		

Network 1: Engine inverter in ST



Network 2:

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	<div><div><div><div>%DB30</div><div>"Simulation_DB"</div></div><div><div>%FB2</div><div>"Simulation"</div></div></div><div>EN</div><div>ENO</div></div>	

Engine_Invert [FB1]

Engine_Invert Properties

General

Name	Engine_Invert	Number	1	Type	FB
Language	SCL	Numbering	Automatic		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

Name	Data type	Default value
Input		
Output		
InOut		
▼ Static		
Eng1_Tmr	TON	
Eng2_Tmr	TON	
Clmp_Tmr	TON	
UnClmp_Tmr	TON	
RUnClmp_Tmr	TON	
IStep	Int	0
RStep	Int	0
Temp		
Constant		

```
0001 // Engine Inverter in ST
0002 //
0003 // Start/stop of operation
0004 IF ("START_PB" AND NOT "Int_Reset") THEN
0005     "Run" := 1;
0006 END_IF;
0007 IF ("Run" AND NOT "STOP_PB") THEN
0008     "Run" := 0;
0009 END_IF;
0010 //
0011 // Normal operation transition out of initial step
0012 IF "Run" AND (#IStep = 0) THEN
0013     #IStep := 1;
0014 END_IF;
0015 //
0016 // Transitions for normal operation
0017 CASE #IStep OF
0018     1:
0019         IF "PROX1" AND "Run" THEN
0020             #IStep := 2;
0021         END_IF;
0022     2:
0023         #Eng1_Tmr(IN := True,
0024             PT := T#2s);
0025         IF #Eng1_Tmr.Q THEN
0026             #Eng1_Tmr(IN := False,
```

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0027	PT := T#2s); // Must run timer again to reset	
0028	#IStep := 3;	
0029	END_IF;	
0030	3:	
0031	IF "PALL_UPLS" AND "Run" THEN	
0032	#IStep := 4;	
0033	END_IF;	
0034	4:	
0035	IF "ROTR_DNLS" AND "Run" THEN	
0036	#IStep := 5;	
0037	END_IF;	
0038	5:	
0039	#Clmp_Tmr(IN := True,	
0040	PT := T#1s500ms);	
0041	IF #Clmp_Tmr.Q THEN	
0042	#Clmp_Tmr(IN:=False, PT:=T#1s);	
0043	#IStep := 6;	
0044	END_IF;	
0045	6:	
0046	IF "ROTR_UPLS" AND "Run" THEN	
0047	#IStep := 7;	
0048	END_IF;	
0049	7:	
0050	IF "ROTR_CWLS" AND "Run" THEN	
0051	#IStep := 8;	
0052	END_IF;	
0053	8:	
0054	IF "ROTR_DNLS" AND "Run" THEN	
0055	#IStep := 9;	
0056	END_IF;	
0057	9:	
0058	#UnClmp_Tmr(IN := True,	
0059	PT := T#1s);	
0060	IF #UnClmp_Tmr.Q THEN	
0061	#UnClmp_Tmr(IN := FALSE,	
0062	PT := T#1s);	
0063	#IStep := 10;	
0064	END_IF;	
0065	10:	
0066	IF "ROTR_UPLS" AND "Run" THEN	
0067	#IStep := 11;	
0068	END_IF;	
0069	11:	
0070	IF "ROTR_CCWLS" AND "Run" THEN	
0071	#IStep := 12;	
0072	END_IF;	
0073	12:	
0074	IF (NOT "PALL_UPLS") AND "Run" THEN	
0075	#IStep := 13;	
0076	END_IF;	
0077	13:	
0078	#Eng2_Tmr(IN := True,	
0079	PT := T#3s);	
0080	IF #Eng2_Tmr.Q THEN	
0081	#Eng2_Tmr(IN := False,	

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<pre> 0082 PT := T#3s); 0083 ; 0084 #IStep := 1; 0085 END_IF; 0086 ELSE 0087 #IStep := 0; 0088 END_CASE; 0089 // 0090 // Start/stop for reset operation 0091 IF ("RESET_PB" AND NOT "Run") THEN 0092 "Int_Reset" := 1; 0093 END_IF; 0094 IF ("Int_Reset" AND #RStep = 4) THEN 0095 "Int_Reset" := 0; 0096 END_IF; 0097 // 0098 // Reset initial transition and clear normal step number 0099 IF "Int_Reset" AND #RStep = 0 THEN 0100 #RStep := 1; 0101 #IStep := 0; 0102 END_IF; 0103 // 0104 // Reset operation transitions 0105 CASE #RStep OF 0106 1: 0107 #RunClmp_Tmr(IN := True, 0108 PT := T#1s); 0109 IF #RunClmp_Tmr.Q THEN 0110 #RunClmp_Tmr(IN := False, 0111 PT := T#1s); 0112 #RStep := 2; 0113 END_IF; 0114 2: 0115 IF "ROTR_UPLS" THEN 0116 #RStep := 3; 0117 END_IF; 0118 3: 0119 IF "ROTR_CCWLS" THEN 0120 #RStep := 4; 0121 END_IF; 0122 4: 0123 IF (NOT "Int_Reset") THEN 0124 #RStep := 0; 0125 END_IF; 0126 ELSE 0127 #RStep := 0; 0128 END_CASE; 0129 // 0130 // Control of outputs; 0131 IF (#IStep = 2) THEN 0132 "ENGL_RET" := 1; 0133 ELSE 0134 "ENGL_RET" := 0; 0135 END_IF; 0136 IF (#IStep = 13) THEN </pre>		

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<pre> 0137 "ENG2_RET" := 1; 0138 ELSE 0139 "ENG2_RET" := 0; 0140 END_IF; 0141 IF ((#IStep = 6) OR (#IStep = 10) AND "Run") OR (#RStep = 2) THEN 0142 "ROTR_UP" := 1; 0143 ELSE 0144 "ROTR_UP" := 0; 0145 END_IF; 0146 IF ((#IStep = 4) OR (#IStep = 8) AND "Run") THEN 0147 "ROTR_DOWN" := 1; 0148 ELSE 0149 "ROTR_DOWN" := 0; 0150 END_IF; 0151 IF ((#IStep = 7) AND "Run") THEN 0152 "ROTAT_CW" := 1; 0153 ELSE 0154 "ROTAT_CW" := 0; 0155 END_IF; 0156 IF ((#IStep = 11) AND "Run") OR (#RStep = 3) THEN 0157 "ROTAT_CCW" := 1; 0158 ELSE 0159 "ROTAT_CCW" := 0; 0160 END_IF; 0161 IF (#IStep >= 5) AND (#IStep <= 8) THEN 0162 "GRIP_CLOS" := 1; 0163 ELSE 0164 "GRIP_CLOS" := 0; 0165 END_IF; 0166 IF (#IStep >= 3) AND (#IStep <= 11) THEN 0167 "PALL_UPCTL" := 1; 0168 ELSE 0169 "PALL_UPCTL" := 0; 0170 END_IF; </pre>		

Simulation [FB2]

Simulation Properties

General

Name	Simulation	Number	2	Type	FB
Language	LAD	Numbering	Manual		

Information

Title		Author		Comment	
Family		Version	0.1	User-defined ID	

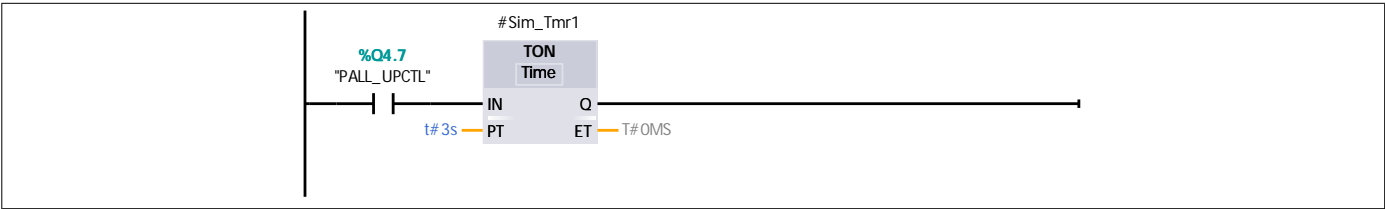
Name	Data type	Default value
Input		
Output		
InOut		
▼ Static		
Sim_Tmr1	TON	
SimTmr2	TON	
SimTmr3	TON	
SimTmr4	TON	
SimTmr5	TON	
SimTmr6	TON	
SimTmr7	TON	
SimTmr8	TON	
Temp		
Constant		

Network 1: Reset

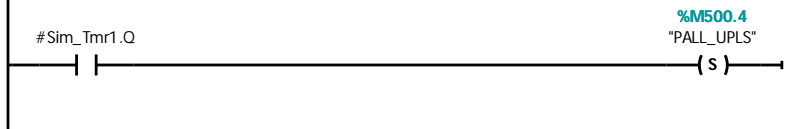
When reset, put engine at hook 1



Network 2: Pallet up LS

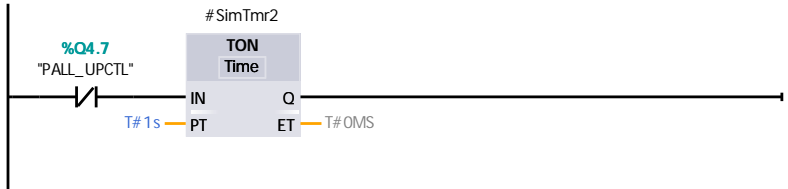


Network 3:

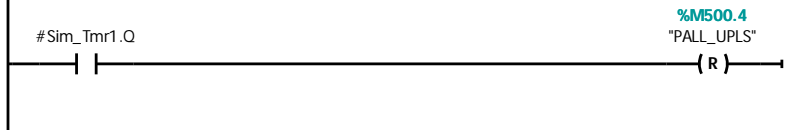


Network 4:

Delay reset when pallet dropped

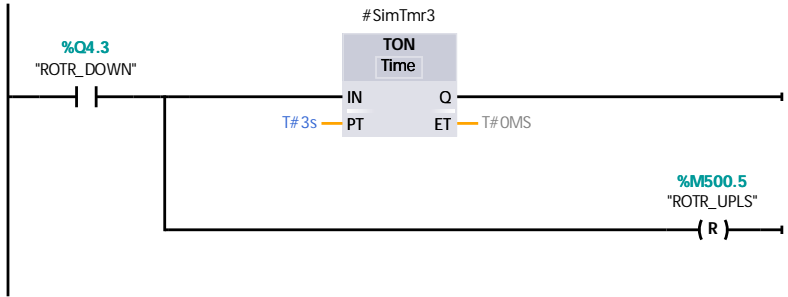


Network 5:

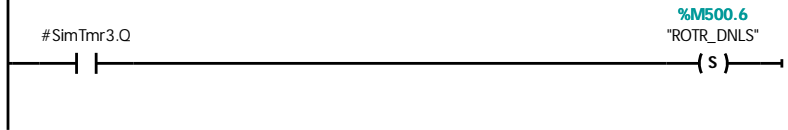


Network 6: Rotor down/up control.

When moved down, the up LS is immediately reset off. After 3 seconds, the down LS is set on

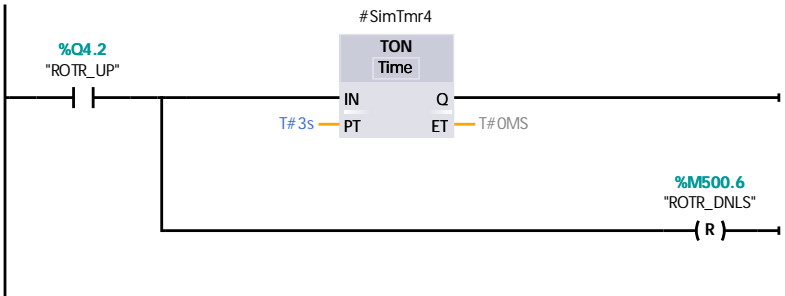


Network 7:

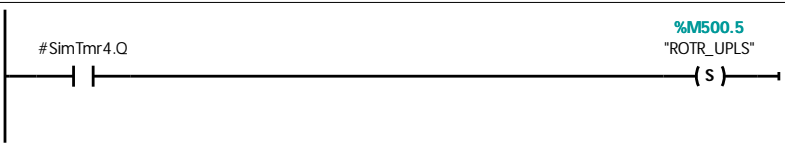


Network 8:

When moved up, the down LS is immediately reset off. After 3 seconds, the up LS is set on

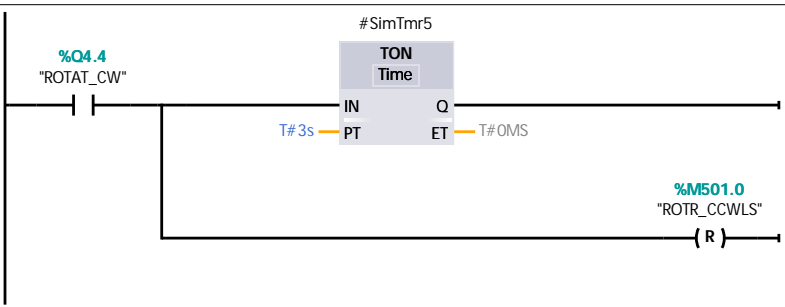


Network 9:



Network 10: Rotor rotating control.

When rotated CW, the CCW LS is immiediately reset off. After 3 seconds, CW LS is set on

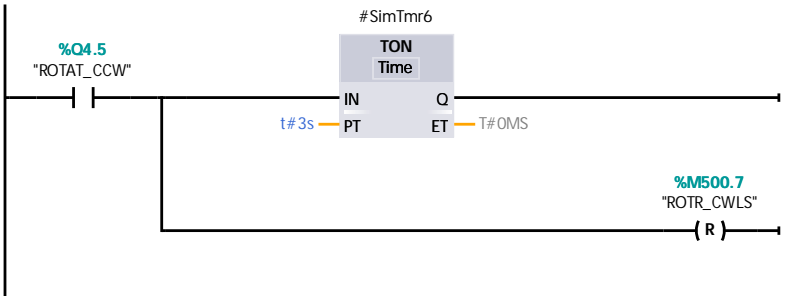


Network 11:



Network 12:

When rotated CCW, the CW LS is immiediately reset off. After 3 seconds, CCW LS is set on

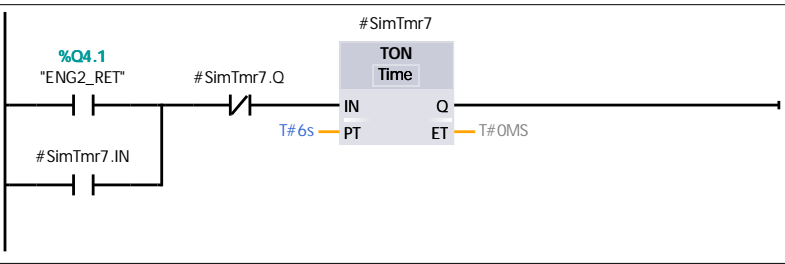


Network 13:

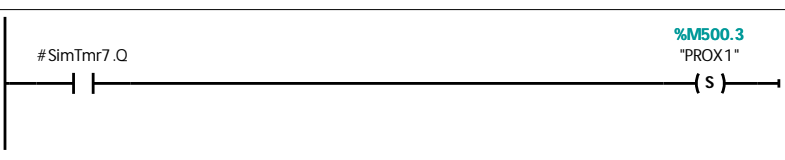


Network 14: Pallet Prox

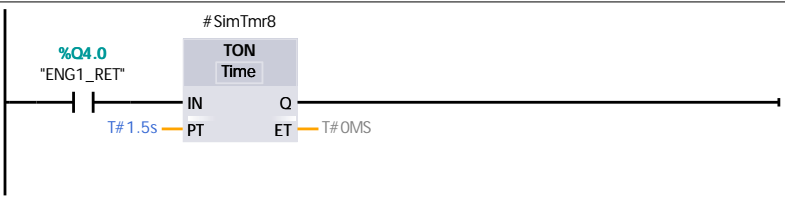
Set it 6 seconds after one has left the station. Reset it 1.5 seconds after a new one let in.



Network 15:



Network 16:



Network 17:

#SimTmr8.Q

%M500.3
"PROX1"

(R)