Totally Integ Automation	grated Portal									
Program	blocks									I
Main [OB1										
Main Propertie General	S									
Name Numbering	Main Automation	C	Number	1		Туре	ОВ	Lan	guage L	AD
Information Title	"Main Pro	gram Sweep (Cy-	Author			Comment		Fam	nily	
Version	cle)" 0.1		User-defined ID							
<b>Name</b> Temp			Data type	Def	fault value		Comment			
Constant										
Network 1:										
			1	%FC1		%FC2				
			— EN	System Process Cor	ENO EN	"Mixing Tank Processes"	ENO -	<u> </u>		
Network 2:										
			1	%FC5		%FC3				
			EN	emperature Manage	ement" "Bo	ttle Filling Conveyor Proc	ess" ENO	<u> </u>		

:lic interru <sub> </sub> neral	ot Properties							
ne nbering	Cyclic interrupt Automatic	Number 30		Туре	ОВ	Language	LAD	
ormation e	Automatic	Author		Comment		Family		
ion	0.1	User-defined ID		Comment		ranniy		
emp		Data type	Default value		Comment			
Constant								
work 1:	Temperature Contro	ol						
		%M160.3	%M400.0		%Q0.5			
		"Step_4"	<b>%M400.0</b> "Temp_in_Range"		%Q0.5 "Heater_On"			
		<b>%M165.5</b> "Heating_Man	,					
1 ~		l						
work 2:								
			%FC4					
		"Error	Management"  ENO					
		•						

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#### RunMode\_Selection [FB1]

RunMode_Selection Properties										
General										
Name	Name   RunMode_Selection   Number   1   Type   FB   Language   SCL									
Numbering	Automatic									
Information										
Title Comment Family										
Version										

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
▼ Input									
Fault	Bool	false	Non-retain	True	True	True	False		Fault detected
AutoMan_Selec	Bool	false	Non-retain	True	True	True	False		Auto Mode Selected
<b>▼</b> Output									
Forced_Manual	Bool	false	Non-retain	True	True	True	False		Forced Manual Mode Confirmed
Manual	Bool	false	Non-retain	True	True	True	False		Manual Mode Confirmed
Automatic	Bool	false	Non-retain	True	True	True	False		Automatic Mode Confirmed
InOut									
▼ Static									
state	Int	1	Retain	True	True	True	False		
Temp									
Constant									

```
0001 // The function creates an interlock between the various run mode of the process.
0002 CASE #state OF
0003 1: //Forced Manual State.
0004
       IF (#AutoMan Selec = 0 AND #Fault = 0) THEN
0005
           #state := 2; // Manual Mode Validated.
0006
        END IF;
0007
        IF (#AutoMan Selec = 1 AND #Fault = 0) THEN
           #state := 3; //Automatic Mode Validated.
0008
0009
        END IF;
0010
         #Forced_Manual := 1; //Machine Mode Outputs.
0011
        #Manual := 0;
0012
        #Automatic := 0;
0013
     2: //Manual State.
0014
       IF \#Fault = 1 THEN
0015
         #state := 1; //Forced Manual Validated.
0016
        END IF;
0017
        IF (#AutoMan_Selec = 1 AND #Fault = 0) THEN
0018
           #state := 3; //Automatic Mode Validated.
0019
        END_IF;
0020
        #Forced_Manual := 0; //Machine Mode Outputs.
0021
        #Manual := 1;
0022
        #Automatic := 0;
0023
     3: //Automatic State.
0024
       IF \#Fault = 1 THEN
0025
         #state := 1; //Force Manual Validated.
0026
        END IF;
0027
        IF (#AutoMan_Selec = 0 AND #Fault = 0) THEN
0028
           #state := 2; //Manual Mode Validated
0029
        END_IF;
0030
         #Forced_Manual := 0; //Machine Mode Outputs
0031
         #Manual := 0;
0032
         #Automatic := 1;
0033 END CASE;
0034
0035
```

Symbol	Address	Туре	Comment
#AutoMan_Selec		Bool	Auto Mode Selected
#Automatic		Bool	Automatic Mode Confirmed
#Fault		Bool	Fault detected
#Forced_Manual		Bool	Forced Manual Mode Confirmed
#Manual		Bool	Manual Mode Confirmed
#state		Int	

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# Vol\_Cyl\_Tank [FB2]

Vol_Cyl_Tank Properties									
General									
Name	Vol_Cyl_Tank	Number	2	Туре	FB	Language	SCL		
Numbering									
Information									
Title		Author		Comment		Family			
Version									

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
<b>▼</b> Input									
Diameter	Real	2.0	Non-retain	True	True	True	False		
Height	Real	10.0	Non-retain	True	True	True	False		
Level	Real	0.0	Non-retain	True	True	True	False		
▼ Output									
Contents	Real	0.0	Non-retain	True	True	True	False		
<b>▼</b> InOut									
Area	Real	0.0	Non-retain	True	True	True	False		
Volume	Real	0.0	Non-retain	True	True	True	False		
Capacity	Real	0.0	Non-retain	True	True	True	False		
Static									
Temp									
Constant									
Pi	Real	3.1416							
Conv	Real	1000.0							

Address	Туре	Comment
	Real	
	Real	
	Real	
1000.0	Real	
	Real	
	Real	
	Real	
3.1416	Real	
	Real	
	1000.0	Real   Real

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# Low\_Pass\_Filter [FB3]

Low_Pass_Filter Properties										
General										
	Name Low_Pass_Filter Number 3 Type FB Language SCL									
Numbering	Automatic									
Information										
Title	Title Comment Family									
Version										

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
<b>▼</b> Input									
Xf	Real	0.0	Non-retain	True	True	True	False		Input to filter
Тс	Real	2.0	Non-retain	True	True	True	False		Time Constant in seconds (default 2.0s)
Ts	Real	0.1	Non-retain	True	True	True	False		Sample Time (default 100ms)
▼ Output									
Output	Int	0	Non-retain	True	True	True	False		
<b>▼</b> InOut									
Yn_1	Real	0.0	Non-retain	True	True	True	False		Previous Filter Output Value
Kf	Real	0.0	Non-retain	True	True	True	False		Filter Gain = Ts/(Ts+Tc)
Yf	Real	0.0	Non-retain	True	True	True	False		Filter output
Static									
Temp									
Constant									

```
0001 // This function block is low pass filter.
0002 // The filter blocks higher frequency to allow a smoother signal.
0003
0004 //Filter Constant.
0005 #Kf := #Ts / (#Ts + #Tc);
0006 //Filter Output.
0007 #Yf := #Yn_1 + (#Kf * (#Xf - #Yn_1));
0008 #Yn_1 := #Yf;
0009 #Output := REAL_TO_INT(#Yn_1);
0010
```

Symbol	Address	Type	Comment
#Kf		Real	Filter Gain = $Ts/(Ts+Tc)$
#Output		Int	
#Tc		Real	Time Constant in seconds (default 2.0s)
#Ts		Real	Sample Time (default 100ms)
#Xf		Real	Input to filter
#Yf		Real	Filter output
#Yn_1		Real	Previous Filter Output Value

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#### Valve [FB4]

Valve Properties							
General							
Name	Valve	Number	4	Туре	FB	Language	SCL
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
▼ Input									
Valve_Sens_Open	Bool	false	Non-retain	True	True	True	False		Valve Sensor State: Open
Valve_ Sens_ Closed	Bool	false	Non-retain	True	True	True	False		Valve Sensor State: Closed
Level_Ok	Bool	false	Non-retain	True	True	True	False		Tank Sensor: Level OK
Valve_Opn_Req	Bool	false	Non-retain	True	True	True	False		Valve Open Request Input
Manual_mode	Bool	false	Non-retain	True	True	True	False		Manual Mode requested
▼ Output									
Valve_Control	Bool	false	Non-retain	True	True	True	False		Valve Control. (True=Open ; False=Close)
Valve_Error	Bool	false	Non-retain	True	True	True	False		Valve Error Status
InOut									
<b>▼</b> Static									
OpenTimer	DInt	0	Non-retain	True	True	True	False		
CloseTimer	DInt	0	Non-retain	True	True	True	False		
Temp									
Constant									

```
0001 // Valve Control and Error Management Function
0002 // If Valve is Requested and no error:
0003 IF #Valve_Opn_Req = 1 AND #Valve_Error=0 THEN
0004 //Turn OpenTimer ON and Reset Closetimer
0005
     #OpenTimer := #OpenTimer + 1;
0006
     #CloseTimer := 0;
0007
      //If Valve_Control is OFF and Timer>=3 then Valve Error.
8000
      IF #Valve_Control = 0 AND #OpenTimer >= 3 THEN
0009
      #Valve_Error := 1;
0010
        //If Sensors and Level Ok then Output ok.
0011
     ELSIF #Level_Ok = 1 THEN
0012
      #Valve_Control := 1;
0013
     END_IF;
0014 END_IF;
0015
0016 //If Valve off requested and no error:
0017 IF #Valve_Opn_Req = 0 AND #Valve_Error = 0 THEN
0018 //Reset OpenTimer and Start CloseTimer.
0019
     #CloseTimer := #CloseTimer + 1;
0020
     #OpenTimer := 0;
0021
     //If Valve_Control is ON and CloseTimer>=3 then valve error
0022
     IF #Valve_Control = 1 AND #CloseTimer >= 3 THEN
0023
      #Valve Error := 1;
0024
     //Else Close Valve
0025
     ELSE
0026
        #Valve_Control := 0;
0027
     END IF;
0028 END IF;
0029 //Sensor Error: If Sensors both open or both closed then error
0030 IF #Valve_Sens_Open = 0 AND #"Valve_ Sens_ Closed" = 0 OR #Valve_Sens_Open = 1 AND #"Valve_ Sens_ Closed" = 1 THEN
0031
       #Valve Error := 1;
0032 ELSIF #Valve_Sens_Open = 0 AND #"Valve_ Sens_ Closed" = 1 OR #Valve_Sens_Open = 1 AND #"Valve_ Sens_ Closed" = 0 THEN
       #Valve_Error := 0;
0033
0034 END IF;
0035 //If Manual Mode is engaged and valve is on then valve error is overriden.
0036 IF #Manual_mode = 1 AND #Valve_Control = 1 THEN
0037
      #Valve_Error := 0;
0038 END_IF;
```

Symbol	Address	Туре	Comment
#"Valve_ Sens_ Closed"		Bool	Valve Sensor State: Closed
#CloseTimer		DInt	
#Level_Ok		Bool	Tank Sensor: Level OK
#Manual_mode		Bool	Manual Mode requested
#OpenTimer		DInt	
#Valve_Control		Bool	Valve Control. (True=Open ; False=Close)
#Valve_Error		Bool	Valve Error Status
#Valve_Opn_Req		Bool	Valve Open Request Input
#Valve_Sens_Open		Bool	Valve Sensor State: Open

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# Recipe Selection [FB5]

Recipe Selection	n Properties						
General							
Name	Recipe Selection	Number	5	Туре	FB	Language	SCL
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

ersion 0.1		er-defined ID							
lame	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	Visible in HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>✓</b> Input									
Bottle_Size_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Bottle_Number_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Product_A_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Product_A_Tol_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Product_B_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Product_B_Tol_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Mix_Temp_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Mix_Temp_Tol_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Mixing_Time_Rec1	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 1
Bottle_Size_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Bottle_Number_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Product_A_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Product_A_Tol_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Product_B_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Product_B_Tol_Rec2	Int	0	Non-retain	True	True	-	False		Parameter Input Rec 2
Mix_Temp_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Mix_Temp_Tol_Rec2	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 2
Mixing_Time_Rec2	Int	0	Non-retain	True	True		False		Parameter Input Rec 2
Bottle_Size_Rec3	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 3
Bottle_Number_Rec3	Int	0	Non-retain	True	True	-	False		Parameter Input Rec 3
Product_A_Rec3	Int	0	Non-retain	True		True	False		Parameter Input Rec 3
Product_A_Tol_Rec3	Int	0	Non-retain	True	True		False		Parameter Input Rec 3
Product_B_Rec3	Int	0	Non-retain	True	True		False		Parameter Input Rec 3
Product_B_Tol_Rec3	Int	0	Non-retain	True	True	-	False		Parameter Input Rec 3
Mix_Temp_Rec3	Int	0	Non-retain	True	True	True	False		Parameter Input Rec 3
Mix_Temp_Tol_Rec3	Int	0	Non-retain	True	True		False		Parameter Input Rec 3
Mixing_Time_Rec3	Int	0	Non-retain	True	True		False		Parameter Input Rec 3
Recipe 1	Bool	false	Non-retain	True	True		False		Recipe 1 Selection
Recipe 2	Bool	false	Non-retain	True	True	-	False		Recipe 2 Selection
Reset	Bool	false	Non-retain	True	True		False		Reset Function Input
Recipe 3	Bool	false	Non-retain	True	True		False		Recipe 3 Selection
Output	2001	14130	Tron retain	1146	1146	1146	1 4.50		nedipe 5 Selection
<u> </u>	Int	0	Non rotain	Truc	True	True	False		Daramatar autnut
Bottle_Size	Int	0	Non-retain	True					Parameter output
Bottle_Number	Int	0	Non-retain	True	True		False		Parameter output
Product_A	Int	0	Non-retain Non-retain	True	True	-	False False		Parameter output Parameter output
Product_A_Tol	Int	0		True	True				<u>'</u>
Product_B	Int	0	Non-retain	True	True		False		Parameter output
Product_B_Tol	Int	0	Non-retain	True	True		False		Parameter output
Mix_Temp	Int	0	Non-retain	True	True	-	False		Parameter output
Mix_Temp_Tol	Int	0	Non-retain	True	True		False		Parameter output
Mixing_Time	Dint	0	Non-retain	True	True		False		Parameter output
Batch_Size_A+B	Int	0	Non-retain	True	True	irue	False		Parameter output
InOut									
<b>▼</b> Static									
State	Int	1	Retain	True	True	True	False		Case state
Temp									
Constant									

```
0001 // This Function allows to create an interlock between different recipes.
0002 // The function will input all recipes parameters and output a single set of parameters
0003
0004 CASE #State OF
0005
      1: //Recipe Selection
0006
        IF (#"Recipe 1" = 0 AND #"Recipe 2" = 0 AND #"Recipe 3" = 0) THEN
0007
           #State := 2; //Recipe 1 parameters passed.
8000
         END IF;
        IF (#"Recipe 1" = 0 AND #"Recipe 2" = 1 AND #"Recipe 3" = 0) THEN
0009
0010
           #State := 3; //Recipe 2 parameters passed.
0011
         END IF;
0012
         IF (#"Recipe 1" = 0 AND #"Recipe 2" = 0 AND #"Recipe 3" = 1) THEN
0013
           #State := 4; //Recipe 3 parameters passed.
0014
         END IF;
0015
         IF (#Reset) THEN
```

```
0016
           #State := 5; //Recipe Reset.
0017
         END IF;
0018
       2: //Recipe 1.
0019
         #Bottle Size := #Bottle Size Rec1;
0020
         #Bottle Number := #Bottle Number Rec1;
0021
         #Product A := #Product A Rec1;
0022
         #Product A Tol := #Product A Tol Rec1;
0023
         #Product B := #Product B Rec1;
0024
         #Product_B_Tol := #Product_B_Tol_Rec1;
0025
         #Mix_Temp := #Mix_Temp_Rec1;
0026
         #Mix_Temp_Tol := #Mix_Temp_Tol_Rec1;
0027
         #Mixing_Time := #Mixing_Time_Rec1;
0028
         #"Batch_Size_A+B" := #Product_A + #Product_B;
0029
       3: //Recipe 2
0030
         #Bottle_Size := #Bottle_Size_Rec2;
         #Bottle Number := #Bottle Number Rec2;
0031
0032
         #Product_A := #Product_A_Rec2;
         #Product A Tol := #Product A Tol Rec2;
0033
0034
         #Product_B := #Product_B_Rec2;
0035
         #Product_B_Tol := #Product_B_Tol_Rec2;
0036
         #Mix_Temp := #Mix_Temp_Rec2;
0037
         #Mix_Temp_Tol := #Mix_Temp_Tol_Rec2;
0038
         #Mixing_Time := #Mixing_Time_Rec2;
0039
         #"Batch_Size_A+B" := #Product_A + #Product_B;
0040
       4: //Recipe 3
0041
         #Bottle_Size := #Bottle_Size_Rec3;
         #Bottle Number := #Bottle Number Rec3;
0042
0043
         #Product A := #Product A Rec3;
         #Product A Tol := #Product A Tol Rec3;
0044
         #Product B := #Product B Rec3;
0045
         #Product B Tol := #Product B Tol Rec3;
0046
0047
         #Mix Temp := #Mix Temp Rec3;
0048
         #Mix Temp Tol := #Mix Temp Tol Rec3;
0049
         #Mixing Time := #Mixing Time Rec3;
0050
         #"Batch Size A+B" := #Product A + #Product B;
0051
       5: //Reset
0052
         #Bottle Size := 0;
0053
         #Bottle Number := 0;
0054
         #Product A := 0;
         #Product A Tol := 0;
0055
0056
         #Product B := 0;
0057
         #Product B Tol := 0;
0058
         \#Mix Temp := 0;
0059
         #Mix Temp Tol := 0;
0060
         #Mixing Time := 0;
0061
         #"Batch Size A+B" := #Product A + #Product B;
0062 END CASE;
```

ymbol	Address Type	Comment
"Batch_Size_A+B"	Int	Parameter output
"Recipe 1"	Bool	Recipe 1 Selection
"Recipe 2"	Bool	Recipe 2 Selection
"Recipe 3"	Bool	Recipe 3 Selection
Bottle_Number	Int	Parameter output
Bottle_Number_Rec1	Int	Parameter Input Rec 1
Bottle_Number_Rec2	Int	Parameter Input Rec 2
Bottle_Number_Rec3	Int	Parameter Input Rec 3
Bottle_Size	Int	Parameter output
Bottle_Size_Rec1	Int	Parameter Input Rec 1
Bottle_Size_Rec2	Int	Parameter Input Rec 2
Bottle_Size_Rec3	Int	Parameter Input Rec 3
Mix_Temp	Int	Parameter output
Mix_Temp_Rec1	Int	Parameter Input Rec 1
Mix_Temp_Rec2	Int	Parameter Input Rec 2
Mix_Temp_Rec3	Int	Parameter Input Rec 3
Mix_Temp_Tol	Int	Parameter output
Mix_Temp_Tol_Rec1	Int	Parameter Input Rec 1
Mix_Temp_Tol_Rec2	Int	Parameter Input Rec 2
Mix_Temp_Tol_Rec3	Int	Parameter Input Rec 3
Mixing_Time	DInt	Parameter output
Mixing_Time_Rec1	Int	Parameter Input Rec 1
Mixing_Time_Rec2	Int	Parameter Input Rec 2
Mixing_Time_Rec3	Int	Parameter Input Rec 3
Product_A	Int	Parameter output
Product_A_Rec1	Int	Parameter Input Rec 1
Product_A_Rec2	Int	Parameter Input Rec 2
Product_A_Rec3	Int	Parameter Input Rec 3
Product_A_Tol	Int	Parameter output
Product_A_Tol_Rec1	Int	Parameter Input Rec 1
Product_A_Tol_Rec2	Int	Parameter Input Rec 2
Product_A_Tol_Rec3	Int	Parameter Input Rec 3
Product_B	Int	Parameter output
Product_B_Rec1	Int	Parameter Input Rec 1
Product_B_Rec2	Int	Parameter Input Rec 2
Product_B_Rec3	Int	Parameter Input Rec 3
Product_B_Tol	Int	Parameter output
Product_B_Tol_Rec1	Int	Parameter Input Rec 1
Product_B_Tol_Rec2	Int	Parameter Input Rec 2
Product_B_Rec2 Product_B_Rec3 Product_B_Tol Product_B_Tol_Rec1	Int Int Int Int	Parameter Input Rec 2 Parameter Input Rec 3 Parameter output Parameter Input Rec 1

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Automation Portal				
Symbol #Product_B_Tol_Rec3	Address	<b>Type</b> Int	Comment Parameter Input Rec 3	
#Reset #State		Bool Int	Reset Function Input Case state	
rstate		IIIC	cuse state	

|--|

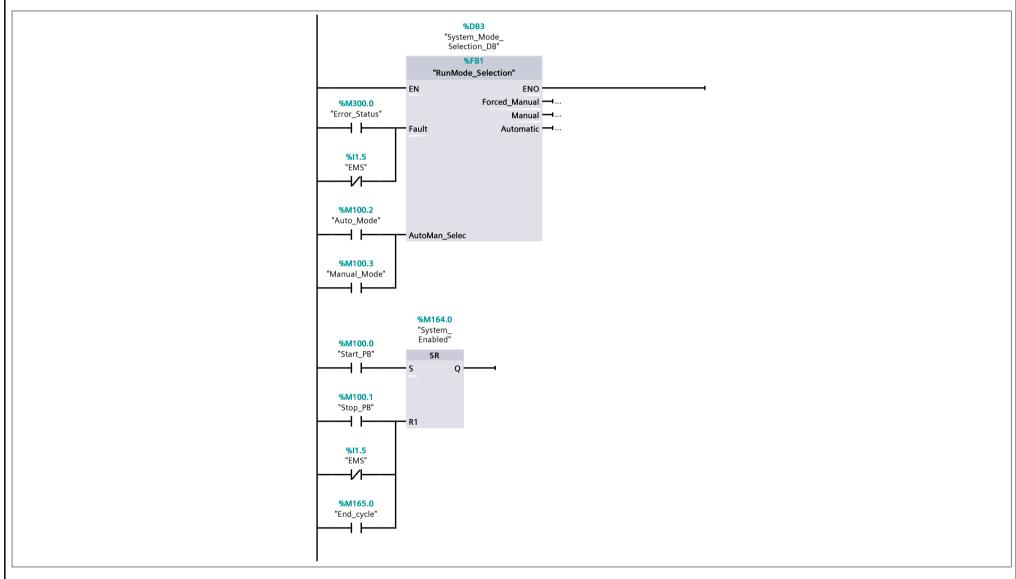
# System Process Control [FC1]

System Proces	s Control Properties						
General							
Name	System Process Control	Number	1	Type	FC	Language	LAD
Numbering	Automatic						
Information							
Title	System Process Control.	Author		Comment	The Sytem Process Control manages: - System Enable (ON/OFF) - Process Mode: Automatic, Manual or Forced Manual Recipe Selection: Recipe 1, Recipe 2 or Recipe 3 Process Sequence.	Family	
Version	0.1	User-defined ID					

Name	Data type	Default value	Comment	
Input				
Output				
InOut				
Temp				
Constant				
▼ Return				
System Process Control	Void			

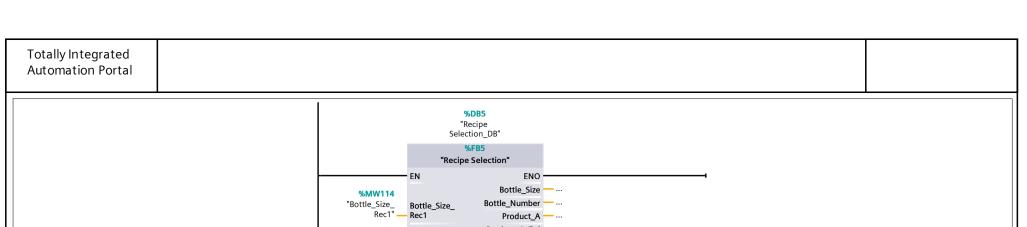
#### **Network 1: System Enable and Process Mode Selection**

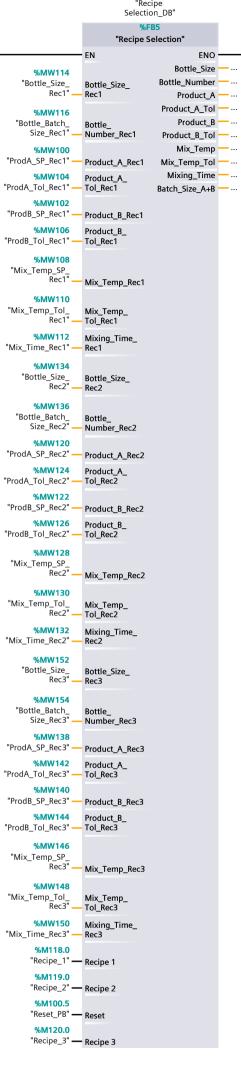
Creates an interlock between the different run modes of the system.



#### **Network 2: Recipe Selection Function**

Passes the recipe parameters when a recipe is selected.



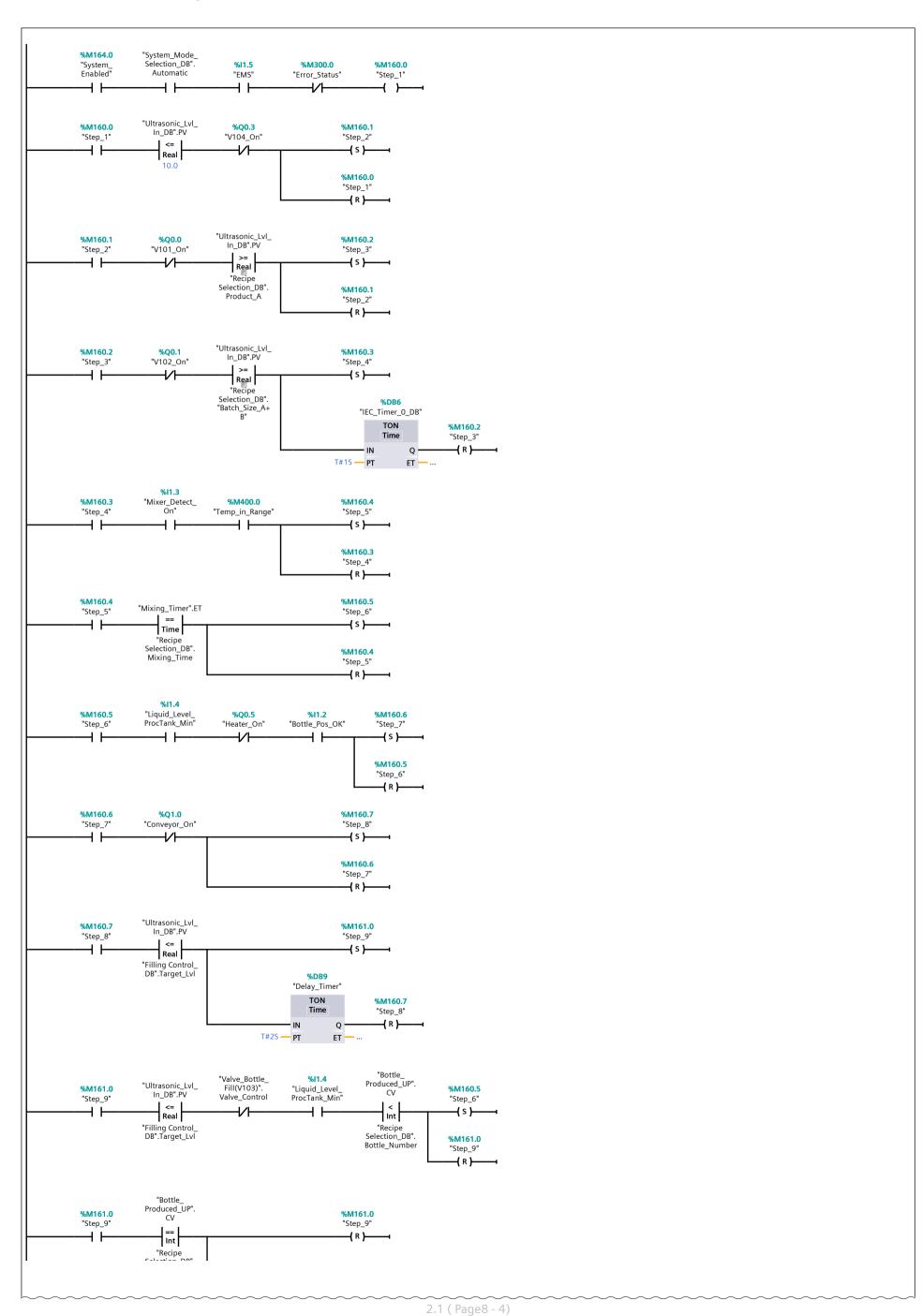


#### **Network 3: Process Sequence Diagram**

Overview of the Automatic Mode process with conditions required for confirm the steps.

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#### Network 3: Process Sequence Diagram (1.1 / 2.1)



Network 3. Process Sequence Diagram 0.212.1)  1.1 (Regard 6)	Totally Integr Automation P	ated				
Serection_ub. %M165.0 Bottle_Number "End_cycle"	Network 3: Pro	ocess Sequence Diagram (2.1 / 2		08 - 3)		
		Seiection_ub . Bottle_Number	%M165.0 "End_cycle"	60-3)	~~~~~	
			( )			

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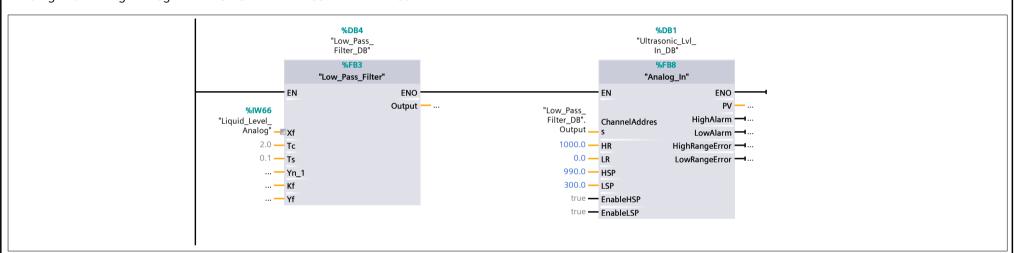
### Mixing Tank Processes [FC2]

Mixing Tank Pr	ocesses Properties						
General							
Name	Mixing Tank Processes	Number	2	Type	FC	Language	LAD
Numbering	Automatic						
Information							
Title		Author		Comment	This function manages the processes relating to the Mixing Tank: - Filling in Mixing Tank with Product A and B Liquid Management in the Mixing Tank Purging Mixing Tank.	Family	
Version	0.1	<b>User-defined ID</b>					

Name	Data type	Default value	Comment	
Input				
Output				
InOut				
Temp				
Constant				
▼ Return				
Mixing Tank Processes	Void			

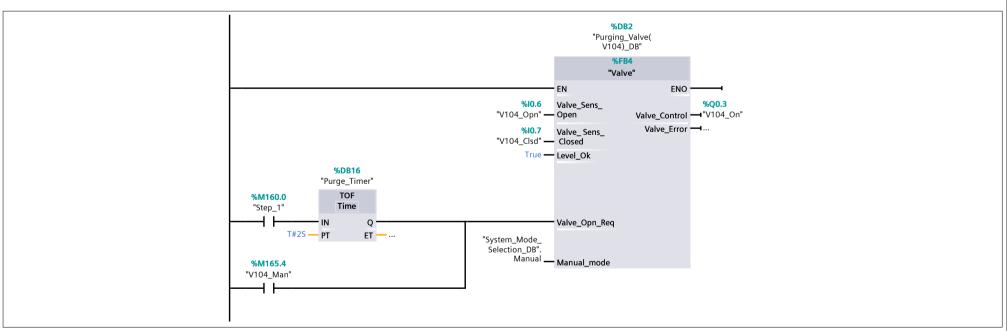
#### Network 1: Ultrasonic Analogue Sensor.

Reading and Scaling Analogue values from the Ultrasonic level Sensor.



#### **Network 2: Mixing Tank Purging.**

Tank Purge = Open Purge Valve until reading from level sensor = 0. (Level input = True)



#### **Network 3: Preparing Product Mix.**

Adding Product A then Product B; Once desired Level reached and Minimum Level Ok = Products Ready. // UPDATE TO TAKE TOLERANCE INTO ACCOUNT (IN\_RANGE).

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```
%DB14
                                                                            "Valve_ProdA(
V101)"
                                                                                %FB4
                                                                               "Valve"
                                                                                                         %Q0.0
                                                       %10.0
                                                                Valve_Sens_
                                                "V101_Opn" — Open
                                                                                      Valve_Control — "V101_On"
                                                                                         %I0.1
"V101_Clsd" — Valve_Sens_
Closed
                                                       %10.1
                                          "ProdA_level_OK" — Level_Ok
                    "Ultrasonic_Lvl_
In_DB".PV
  %M160.1
  "Step_2"
                         <
Real
    Valve_Opn_Req
                    "Recipe
Selection_DB".
Product_A
                                             "System_Mode_
Selection_DB".
Manual _
                                                               Manual_mode
%M165.1
"V101_Man"
                                                                                %DB7
                                                                            "Valve_ProdB(
V102)"
                                                                                %FB4
                                                                               "Valve"
                                                                                                ENO
                                                                 EN
                                                %I0.2
"V102_Opn" — Open
                                                                                                          %Q0.1
                                                                                       Valve_Control
                                                                                                         ⊣"V102_On"
                                                %I0.3
"V102_Clsd" — Valve_ Sens_
Closed
                                                                                                         %M300.0
                                                                                         Valve_Error — "Error_Status"
                                                      %I1.1
                                          "ProdB_level_OK" — Level_Ok
                    "Ultrasonic_Lvl_
In_DB".PV
  %M160.2
  "Step_3"
                         <
Real
                                                                 Valve_Opn_Req
                                            "System_Mode_
Selection_DB".
Manual — Manual_mode
                    "Recipe
Selection_DB".
"Batch_Size_A+
B"
 %M165.2
"V102_Man'
```

#### **Network 4: Mixing and Heating**

Mixer and heating ON. Temperature OK = Mixing Timer ON. Mixing Timer Finished = Heating OFF and Mixing-Heating Complete.

```
*M160.3

*Step_4*

*Miser_On*

(s)

*Q0.6

*Fan_On*

*Step_5*

*Mixing_Time*

*Mixing_Time*
```

|--|

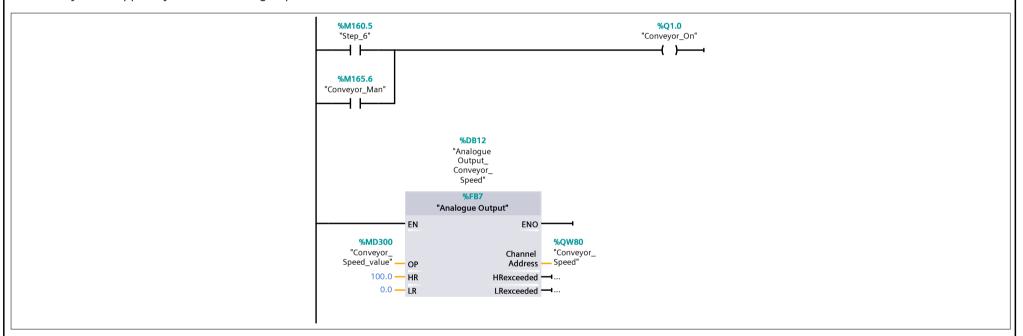
### **Bottle Filling Conveyor Process [FC3]**

Bottle Filling C	onveyor Process Properties									
General										
Name	Bottle Filling Conveyor Process	Number	3	Туре	FC	Language	LAD			
Numbering	Numbering Automatic									
Information										
Title	Conveyor and Bottle Filling Processes	Author		Comment	This Function manages the conveyor and bottle filling process: - Conveyor Control Bottle filling.	Family				
Version	0.1	User-defined ID								

Name	Data type	Default value	Comment	
Input				
Output				
InOut				
Temp				
Constant				
<b>▼</b> Return				
Bottle Filling Conveyor Process	Void			

#### **Network 1: Conveyor Control**

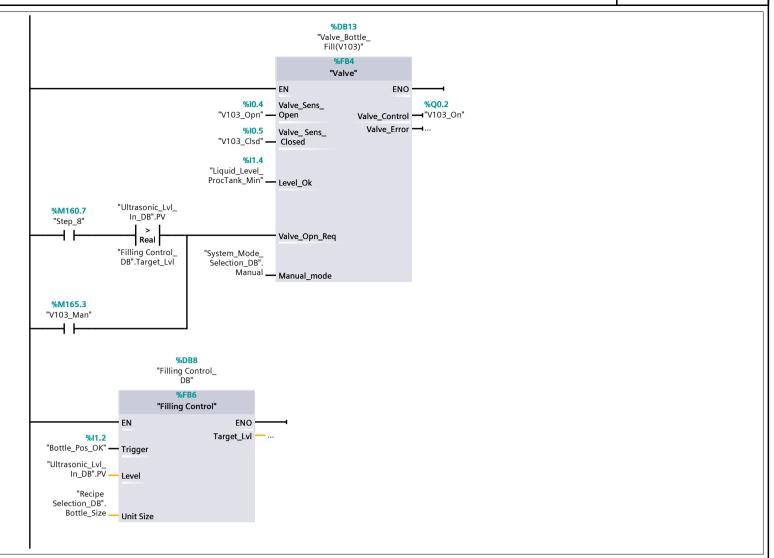
Conveyor Control: The conveyor is activated by the end of the mixing cycle or by the end of a bottle filling. The speed of the conveyor is set by by the analogue output. The conveyor is stopped by the bottle being in position.



#### Network 2: Bottle Filling.

Valve control for the bottle filling: The valve will stay open until the sensor reading is equal to the previous level reading - bottle size (Calculated by FB Filling Control).

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#### **Network 3: Bottle Produced Counter.**

This counts the number of bottles filled, once a bottle leaves the fill in position and the liquid left is equal or less than the liquid left targeted (liquid in the tank - liquid in the bottle).

```
%DB15
                                                                                     "Bottle_
Produced_UP"
                                          "Ultrasonic_Lvl_
In_DB".PV
                                                                                           CTU
     %I1.2
                          %Q1.0
"Bottle_Pos_OK"
                     "Conveyor_On"
                                                                                      CU
                                               Real
                                          "Filling Control_
DB".Target_Lvl
                                                                        %M100.5
                                                                                                        %MW156
                                                                        "Reset_PB" -
                                                                                                        "Bottle_Count"
                                                                                                 CV
                                                                                5 — PV
```

|--|--|

#### Analog\_In [FB8]

Analog_In Prope	erties						
General							
Name	Analog_In	Number	8	Туре	FB	Language	SCL
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

ne	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
nput									
Channel Address	Int	0	Non-retain	True	True	True	False		
HR	Real	100.0	Non-retain	True	True	True	False		
LR	Real	-100.0	Non-retain	True	True	True	False		
HSP	Real	90.0	Non-retain	True	True	True	False		
LSP	Real	10.0	Non-retain	True	True	True	False		
EnableHSP	Bool	true	Non-retain	True	True	True	False		
EnableLSP	Bool	true	Non-retain	True	True	True	False		
Output									
PV	Real	0.0	Non-retain	True	True	True	False		
HighAlarm	Bool	false	Non-retain	True	True	True	False		
LowAlarm	Bool	false	Non-retain	True	True	True	False		
HighRangeError	Bool	false	Non-retain	True	True	True	False		
LowRangeError	Bool	false	Non-retain	True	True	True	False		
InOut									
Static									
Temp									
Constant									

```
0001 // This function block reads analogue input channel and scales
0002 // between HR (High Range) and LR (Low Range) values
0003 // Sets Low and High alarm values against HSP and LSP
0004 // If the A/D converter values are below 0 or over 27648 an error
0005 // will be generated
0006
0007 #PV := ((INT_TO_REAL(#ChannelAddress) * (#HR - #LR)) / 27648) + #LR; // Read and scale A/D Values
0008 IF #EnableHSP = 1 THEN
                                                                    // If High Alarm Enabled
0009
     IF #PV > #HSP THEN
                                                                  // Drive High Alarm
0010
       #HighAlarm := 1;
0011
     ELSIF #PV < #HSP THEN
0012
       #HighAlarm := 0;
0013 END_IF;
0014 END_IF;
0015
0016 IF #EnableLSP = 1 THEN
                                                                    // If Low Alarm Enabled
0017 IF #PV < #LSP THEN
                                                                  // Drive Low Alarm
0018
      #LowAlarm := 1;
0019 ELSIF #PV > #LSP THEN
0020
       #LowAlarm := 0;
0021 END_IF;
0022 END_IF;
0023 IF #ChannelAddress > 27648 THEN
                                                                    // If A/D Values over 27648
0024 #HighRangeError := 1;
                                                                  // Out of high limit
0025 #PV := #HR;
                                                                  // Limit output to maximum value
0026 END_IF;
0027 IF #ChannelAddress < 0 THEN
                                                                    // if A/D Values below 0
0028 #LowRangeError := 1;
                                                                  // Out of low limit
                                                                   // Limit output to minimum value
0029
     #PV := #LR;
0030 END IF;
0031 IF (#ChannelAddress > 0) AND (#ChannelAddress < 27648) THEN
0032 #HighRangeError := 0;
0033 #LowRangeError := 0;
0034 END IF;
0035
0036 //Revision History
0037 //Tested
0038 //REV 1.0
0039
```

Symbol	Address	Туре	Comment
#ChannelAddress		Int	
#EnableHSP		Bool	
#EnableLSP		Bool	
#HighAlarm #HighRangeError		Bool	
#HighRangeError		Bool	
#HR		Real	
#HSP		Real	

				<u>,                                      </u>
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Symbol	Address	Туре	Comment	
#LowAlarm		Bool		
#LowRangeError #LR		Bool Real		
#LSP		Real		
#PV		Real		
<del>                                     </del>				

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### Analogue Output [FB7]

Analogue Outp	ut Properties						
General							
Name	Analogue Output	Number	7	Туре	FB	Language	SCL
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
<b>▼</b> Input									
OP	Real	0.0	Non-retain	True	True	True	False		Value to be output to D/A
HR	Real	4.0	Non-retain	True	True	True	False		Maximum Value of Output
LR	Real	8.0	Non-retain	True	True	True	False		Minimum Value of Output
▼ Output									
Channel Address	Int	0	Non-retain	True	True	True	False		D/A Channel Address
HRexceeded	Bool	0	Non-retain	True	True	True	False		Input Signal Out of Upper Range
LRexceeded	Bool	0	Non-retain	True	True	True	False		Input Signal Out of Lower Range
InOut									
Static									
Temp									
Constant									

```
0001 // Function Scales a Real Analogue Value to an integer
0002 // Between 0 and 27648 for driving the output card
0003 IF (#LR < #OP) AND (#OP < #HR) THEN
0004 #HRexceeded := 0;
0005 #LRexceeded := 0;
0006 END_IF;
0007 //
0008 // Range Real Value
0009 #"Channel Address" := DINT_TO_INT(ROUND((#OP * 27648.0) / (#HR - #LR)));
0010 //
0011 //Range Checking
0012 IF #OP > #HR THEN
0013 #"Channel Address" := 27648;
0014 #HRexceeded := 1;
0015 END_IF;
0016 IF #OP < #LR THEN
0017 #"Channel Address" := 0;
0018 #LRexceeded := 1;
0019 END_IF;
```

Symbol	Address	Туре	Comment
#"Channel Address"		Int	D/A Channel Address
#HR		Real	Maximum Value of Output
#HRexceeded		Bool	Input Signal Out of Upper Range
#LR		Real	Minimum Value of Output
#LRexceeded		Bool	Input Signal Out of Lower Range
#OP		Real	Value to be output to D/A

|--|

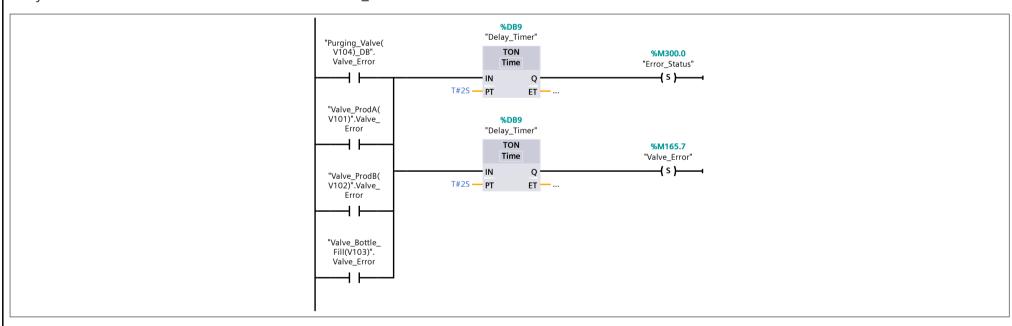
#### **Error Management [FC4]**

Error Manage	ment Properties						
General							
Name	Error Management	Number	4	Туре	FC	Language	LAD
Numbering	Automatic				·		
Information							
Title	Error Management and Machine Reset.	Author		Comment	This Block Manages the error cases and Reset function: - If Stop, EMS or Reset are hit the machine will stop and reset If the heating element is on and the liquid level is below 300L or the level switch is off an error will be triggered At the bottling stage if the conveyor is on for a minute with no bottles the machine will stop If the level for each product A and B goes above or below the levels of tolerances an error will be triggered.		
Version	0.1	<b>User-defined ID</b>					

Name	Data type	Default value	Comment	
Input				
Output				
InOut				
Temp				
Constant				
▼ Return				
Error Management	Void			

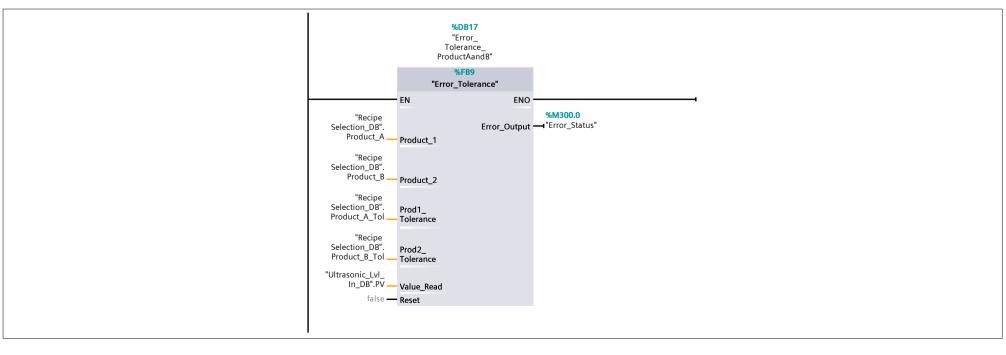
#### **Network 1: Error Management Valves**

If any of the valve control functions return an error the error\_status is set.



#### **Network 2: Liquid Level Tolerance error**

Function block managing the liquid tolerance error levels for product A and B.



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Network 3: Conveyor	Error	

If bottling process ON and no bottle detected for 30 seconds and error will be triggered

```
%DB19
"Timer_Conveyor"
                                                                                    %M300.0
"Error_Status"
%M160.5 "Step_6"
                                            TON
                       %I1.2
                  "Bottle_Pos_OK"
                             T#60s — PT
                                                    ET --- ...
                                                                                       %M166.1
                                                                                    "Conveyor_error"
                                                                                         -( s )-
```

#### **Network 4: Heating Element Protection**

If the heating element is ON or triggered when the minimum liquid level in the mixing tank is too low an error will be triggered.

```
%l1.4
"Liquid_Level_
ProcTank_Min"
                                                                                                       %M300.0
"Error_Status"
   %Q0.5
"Heater_On"
                               -//⊢
                                                                                                             -( s )--
                                                                                                          %M166.0
                       "Ultrasonic_Lvl_
In_DB".PV
                                                                                                      "Heater_liquid_
error"
                            <=
Real
                                                                                                             -( s )--
                              300.0
```

#### Network 5: System Reset

System can be reset by: Reset\_PB, EMS and Stop\_PB.

**Automation Portal %M100.5** "Reset\_PB" **%M160.0** "Step\_1" **-(** R **)**− **%I1.5** "EMS" **%M160.1** "Step\_2" **-(** R **)**--**%M100.1** "Stop\_PB" **%M160.2** "Step\_3" -( R )-%M300.0 "Error\_Status" **%M160.3** "Step\_4" **-(** R **)**− **%M160.4** "Step\_5" **-(** R **)**--**%M160.5** "Step\_6" **-(** R **)**-**%M160.6** "Step\_7" **-(** R **)**− **%M160.7** "Step\_8" **-(** R **)**--**%M161.0** "Step\_9" **-(** R **)**-**%M400.0**"Temp\_in\_Range" **-(** ℝ **)**--%Q0.6 "Fan\_On" **-(** R **)**--**%Q0.4** "Mixer\_On" **-(** ℝ **)**--%M161.4 "Mixing\_done" **-(** ℝ **)**--**%I1.2**"Bottle\_Pos\_OK" -( R )-----"Bottle\_ Produced\_UP".R %Q1.0 "Conveyor\_On" **-(** ℝ **)**--**%M100.2** "Auto\_Mode" -( R )---**Network 6: Error Reset** Error Status can be reset using the Reset button. **%M100.5** "Reset\_PB" %M300.0 "Error\_Status" +-( R )-%M166.1 "Conveyor\_error" -( R )-%M166.0 "Heater\_liquid\_ error" %M165.7 "Valve\_Error" \_( R )\_\_\_\_

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Totally Integr Automation F							
Program l	olocks						
	llve(V104)_DB [DB2	l					
Purging_Valve(\	/104)_DB Properties						
General							
Name	Purging_Valve(V104)_DB	Number	2	Туре	DB	Language	DB
Numbering	Automatic						

Numbering Information

itle	A	uthor		Comment		Family			
ersion 0.1	U	ser-defined ID							
Name	Data type	Start valu	e Retain	Accessible from HMI/OPC UA	able	Visible in HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>▼</b> Input									
Valve_Sens_Open	Bool	false	False	True	True	True	False		Valve Sensor State: Open
Valve_ Sens_ Closed	Bool	false	False	True	True	True	False		Valve Sensor State: Closed
Level_Ok	Bool	false	False	True	True	True	False		Tank Sensor: Level OK
Valve_Opn_Req	Bool	false	False	True	True	True	False		Valve Open Request Input
Manual_mode	Bool	false	False	True	True	True	False		Manual Mode requested
<b>▼</b> Output									
Valve_Control	Bool	false	False	True	True	True	False		Valve Control. (True=Open ; False=Close)
Valve_Error	Bool	false	False	True	True	True	False		Valve Error Status
InOut									
<b>▼</b> Static									
OpenTimer	DInt	0	False	True	True	True	False		
CloseTimer	DInt	0	False	True	True	True	False		

Name   System, Mode_Selection_0B   Number   3   Type   D8   Language   D8   Numbering   Authoritide   Number
Title   Author   Comment   Family    Name   Data type   Start value   Retain   Accessible   HMI/OPC   UA    Fault   Bool   false   False   True   True   False   Auto Mode Selected    Volume   Manual   Bool   false   False   True   True   False   Auto Mode Selected    Forced_Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Auto Mode Confirmed    Manual   Bool   false   False   True   True   False   Automatic    Manual   Mode Confirmed
Name    Data type   Start value   Retain   Accessible   Millor
Name  Data type  Start value  Retain from hMI/OPC UA  With from hMI/OPC UA  HMI/OPC UA  Pault  Fault  Bool False False False False False False Forced_Manual Forced_Manual Bool False Forced Manual Mode Confirmed Automatic Bool False False False False False False False False Automatic Bool False False False False False False False False Automatic Mode Confirmed InOut  Supervi-
Input       UA       UA       Input         Fault       Bool       false       False       True       True       False       Fault detected         AutoMan_Selec       Bool       false       False       True       True       False       Auto Mode Selected         ✓ Output       Forced_Manual       Bool       false       False       True       True       False       Forced Manual Mode Cordirmed         Manual       Bool       false       False       True       True       False       Manual Mode Confirmed         Automatic       Bool       false       False       True       True       False       Automatic Mode Confirmed         InOut       Static       Static       Inout
Fault Bool false False True True False Fault detected AutoMan_Selec Bool false False True True True False Auto Mode Selected  ✓ Output  Forced_Manual Bool false False True True True False Forced Manual Mode Cor Manual Bool false False True True True False Manual Mode Confirmed Automatic Bool false False True True True False Automatic Mode Confirmed  InOut  ✓ Static
AutoMan_Selec  Bool false False True True True False Auto Mode Selected  True False Forced_Manual  Forced_Manual Bool false False False True True False Forced Manual Mode Cor Manual Automatic Bool false False False False True True False Manual Mode Confirmed True False Manual Mode Confirmed True False Manual Mode Confirmed True False Automatic Mode Confirmed  Static
▼ Output       Bool       false       False       True       True       False       Forced Manual Mode Cord         Manual       Bool       false       False       True       True       False       Manual Mode Confirmed         Automatic       Bool       false       False       True       True       False       Automatic Mode Confirmed         InOut       Static       Inout
Forced_Manual Bool false False True True True False Forced Manual Mode Cord Manual Bool false False True True True False Manual Mode Confirmed Automatic Bool false False True True True True False Automatic Mode Confirmed InOut Static
Manual     Bool     false     False     True     True     True     False     Manual Mode Confirmed       Automatic     Bool     false     False     True     True     True     False     Automatic Mode Confirmed       InOut     Static     Static     In I
InOut  ✓ Static
r Static
state Int 1 True True True True False

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Program blocks		
Ultrasonic Lyl In	DR [DR1]	

Ultrasonic_Lvl_I	n_DB Properties						
General							
Name	Ultrasonic_Lvl_In_DB	Number	1	Туре	DB	Language	DB
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	<b>User-defined ID</b>					

Name	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	Visible in HMI engi- neering		Supervi- sion	Comment
<b>▼</b> Input									
Channel Address	Int	0	False	True	True	True	False		
HR	Real	100.0	False	True	True	True	False		
LR	Real	-100.0	False	True	True	True	False		
HSP	Real	90.0	False	True	True	True	False		
LSP	Real	10.0	False	True	True	True	False		
EnableHSP	Bool	true	False	True	True	True	False		
EnableLSP	Bool	true	False	True	True	True	False		
▼ Output									
PV	Real	0.0	False	True	True	True	False		
HighAlarm	Bool	false	False	True	True	True	False		
LowAlarm	Bool	false	False	True	True	True	False		
HighRangeError	Bool	false	False	True	True	True	False		
LowRangeError	Bool	false	False	True	True	True	False		
InOut									
Static									

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# Low\_Pass\_Filter\_DB [DB4]

Low_Pass_Filter	_DB Properties						
General							
Name	Low_Pass_Filter_DB	Number	4	Туре	DB	Language	DB
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

Name	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
▼ Input									
Xf	Real	0.0	False	True	True	True	False		Input to filter
Тс	Real	2.0	False	True	True	True	False		Time Constant in seconds (default 2.0s)
Ts	Real	0.1	False	True	True	True	False		Sample Time (default 100ms)
▼ Output									
Output	Int	0	False	True	True	True	False		
<b>▼</b> InOut									
Yn_1	Real	0.0	False	True	True	True	False		Previous Filter Output Value
Kf	Real	0.0	False	True	True	True	False		Filter Gain = Ts/(Ts+Tc)
Yf	Real	0.0	False	True	True	True	False		Filter output
Static									

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# Recipe Selection\_DB [DB5]

<b>Recipe Selection</b>	_DB Properties						
General							
Name	Recipe Selection_DB	Number	5	Туре	DB	Language	DB
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

ame	Data type	Start value	Retain		able	Visible in HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>r</b> Input					UA				
Bottle_Size_Rec1	Int	0	False	True	True	True	False		Parameter Input Rec 1
Bottle_Number_Rec1	Int	0	False	True	True	True	False		Parameter Input Rec 1
Product_A_Rec1	Int	0	False	True	True	True	False		Parameter Input Rec 1
Product_A_Tol_Rec1	Int	0	False	True	True	True	False		Parameter Input Rec 1
Product_B_Rec1	Int	0	False	True	True	True	False		Parameter Input Rec 1
Product_B_Tol_Rec1	Int	0	False	True	True		False		Parameter Input Rec 1
Mix_Temp_Rec1	Int	0	False	True	True		False		Parameter Input Rec 1
Mix_Temp_Tol_Rec1	Int	0	False	True	True		False		Parameter Input Rec 1
Mixing_Time_Rec1	Int	0	False	True	True		False		Parameter Input Rec 1
Bottle_Size_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Bottle_Number_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Product_A_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Product_A_Tol_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Product_B_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Product_B_Tol_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Mix_Temp_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Mix_Temp_Tol_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Mixing_Time_Rec2	Int	0	False	True	True		False		Parameter Input Rec 2
Bottle_Size_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Bottle_Number_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Product_A_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Product_A_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Product_B_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Product_B_Tol_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Mix_Temp_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Mix_Temp_Tol_Rec3	Int	0	False	True	True		False		Parameter Input Rec 3
Mixing_Time_Rec3	Int	0	False		True		False		Parameter Input Rec 3
Recipe 1	Bool	false	False	True	True		False		Recipe 1 Selection
Recipe 2	Bool	false	False	True	True		False		Recipe 2 Selection
Reset	Bool	false	False	True	True		False		Reset Function Input
Recipe 3	Bool	false	False	True	True		False		Recipe 3 Selection
r Output	ВООТ	laise	l dise	iiue	Tiue	Tiue	i dise		Necipe 3 Selection
<u>'</u>				_	_	_			
Bottle_Size	Int	0	False	True	True		False		Parameter output
Bottle_Number	Int	0	False	True	True		False		Parameter output
Product_A	Int	0	False	True	True		False		Parameter output
Product_A_Tol	Int	0	False	True	True		False		Parameter output
Product_B	Int	0	False	True	True		False		Parameter output
Product_B_Tol	Int	0	False	True	True		False		Parameter output
Mix_Temp	Int	0	False	True	True		False		Parameter output
Mix_Temp_Tol	Int	0	False	True	True		False		Parameter output
Mixing_Time	DInt	0	False	True	True		False		Parameter output
Batch_Size_A+B	Int	0	False	True	True	True	False		Parameter output
InOut									
Static									
State	Int	1	True	True	True	True	False		Case state

Mathodic	eneral ame	Temperatur	re Measure-	Number	10		Type	D	R		Langua	age	DB	
Note		ment_In	re_Measure-	Number	10		Туре	D	В		Langua	age 	DR	
Note   Mathematical Parison   O.1   Mathema	ımbering formation	Automatic												
Retain from HMI/OPC UA PRIVATE	tle						Comment				Family	•		
InputInt0FalseTrueTrueFalseIntInt0FalseTrueTrueFalseIntInt0FalseTrueTrueFalseIntInt0FalseTrueTrueFalseIntInt0FalseTrueTrueFalseIntInt0FalseTrueTrueFalseInt		0.1												
Input         Int         O         False         True         True         False         Int         False         Int         Int         O         False         True         True         False         Int         False         Int         Int         Int         False         Int	ıme		Data typ	oe Start va	ilue	Retain	from HMI/OPC	able from HMI/ OPC	HMI engi-	Setpoint		Comme	ent	
HR Real 100.0 False True True False False LR Real -100.0 False True True False Palse	Input							UA						
LRReal-100.0FalseTrueTrueFalseFalseHSPReal90.0FalseTrueTrueTrueFalseLSPReal10.0FalseTrueTrueFalseEnableHSPBooltrueFalseTrueTrueFalseEnableLSPBooltrueFalseTrueTrueFalseOutputTrueFalseTrueTrueFalsePVReal0.0FalseTrueTrueFalseHighAlarmBoolfalseFalseTrueTrueFalseLowAlarmBoolfalseFalseTrueTrueFalseHighRangeErrorBoolfalseFalseTrueTrueFalseLowRangeErrorBoolfalseFalseTrueTrueFalseInOutTrueFalseTrueTrueFalse	Channel	Address	Int	0		False	True	True	True					
HSP Real 90.0 False True True False														
LSPReal10.0FalseTrueTrueTrueFalseEnableHSPBooltrueFalseTrueTrueTrueFalseEnableLSPBooltrueFalseTrueTrueTrueFalseOutputReal0.0FalseTrueTrueTrueFalseHighAlarmBoolfalseFalseTrueTrueTrueFalseLowAlarmBoolfalseFalseTrueTrueTrueFalseHighRangeErrorBoolfalseFalseTrueTrueTrueFalseLowRangeErrorBoolfalseFalseTrueTrueTrueFalseInOutInou														
EnableLSP Bool true False True True False True False   EnableLSP Bool true False True True False   Output Real 0.0 False True True True False   HighAlarm Bool false False False True True True False   LowAlarm Bool false False True True True False   HighRangeError Bool false False True True True False   LowRangeError Bool false False True True True False   InOut True False   Inout False True True False   Inout False True True False   Inout False   Inout True False   Inout Inout Inout Inou Inou Inou Inou Inou Inou Inou Inou														
EnableLSP Output  PV Real O.0 false False False True True False		SP												
Output Real 0.0 False True True True False False False LowAlarm Bool false False False True True True True False False False False False False False False True True False Fal														
PV Real 0.0 False True True False HighAlarm Bool false False True True True False LowAlarm Bool false False True True True True False LowAlarm Bool false False True True True True False LowRangeError Bool false False True True True True False InOut False True True False False True True False False True True False InOut True False False True True True False False True True False InOut True False False True True True False False True True True False InOut True False False True True True False True True False InOut True False True True True False True True True False True True True True True False True True True True True True True Tru		J1	5001	uue		1 0130	1146	iiue	1146	, aise				
HighAlarm Bool false False True True False  LowAlarm Bool false False True True True False  HighRangeError Bool false False True True True False  LowRangeError Bool false False True True True False  InOut False True True True False  InOut False True True True False  InOut True False  InOut Inout Inout Inout Inout Inou Inou Inou Inou Inou Inou Inou Inou			Roal	0.0		Falso	True	Truc	True	False				
LowAlarm Bool false False True True False False HighRangeError Bool false False True True True False LowRangeError Bool false False True True True False InOut False True True True False False True True False False True True True False True True False InOut True False True True False True True False True True False True True False InOut True True False True True True False True True True False True True False True True True False True True False True True True True False True True True True False True True True True True True True Tru		rm												
HighRangeErrorBoolfalseFalseTrueTrueFalseLowRangeErrorBoolfalseFalseTrueTrueTrueFalseInOutInout								_						
LowRangeError Bool false False True True False InOut True False														
	LowRang		Bool	false		False	True	True	True	False				
State	InOut													
, and the second														

|--|

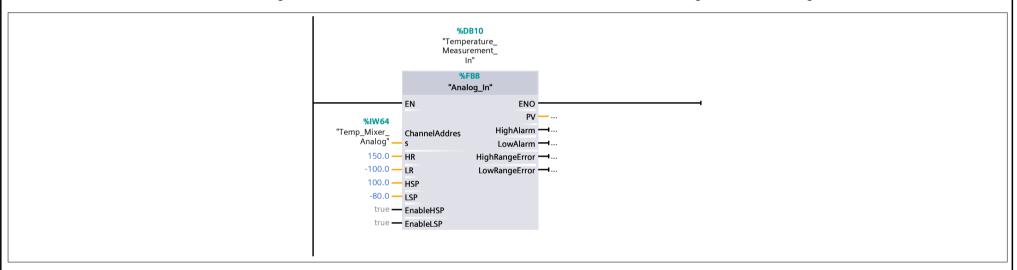
#### **Temperature Management [FC5]**

Temperature M	lanagement Properties						
General							
Name	Temperature Management	Number	5	Туре	FC	Language	LAD
Numbering	Automatic						
Information							
Title		Author		Comment	This function manages the Temperature Functionalities of the programme: - Reading and Scaling an Analogue Value Temperature in range check.		
Version	0.1	<b>User-defined ID</b>					

Name	Data type	Default value	Comment	
Input				
Output				
InOut				
<b>▼</b> Temp				
Temp_Limit_Low_Range Temp_Limit_High_Range	Real			
Temp_Limit_High_Range	Real			
Constant				
<b>▼</b> Return				
Temperature Management	Void			

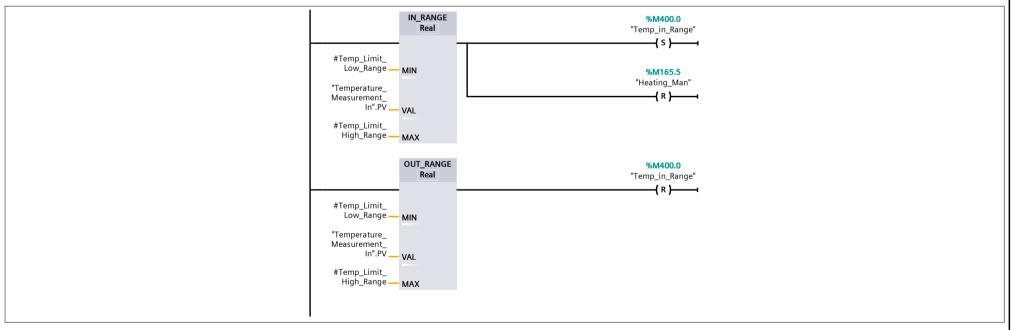
#### **Network 1: Analogue Temperature Input**

The Function Block reads and Scales the analogue values between -200 and 200°C. Also Provides alarms when reading exceed 150°C or goes below -100°C.



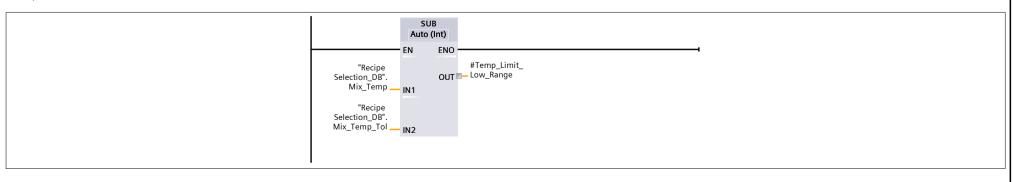
#### **Network 2: Temperature in Range Confirmation**

 $\text{IF PV (Temp Reading in) (SetPoint-Tolerance} ^{\circ}\text{C)} < \text{Temperature IN} < (\text{SetPoint+Tolerance} ^{\circ}\text{C}) == \text{Temperature is in range}.$ 



#### Network 3:

Temperature Min calculation == SetPoint - Tolerance



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Network 4:		
Temperature Max Calcul	ation == SetPoint + Tolerance	
	ADD Auto (Int)  EN ENO  "Recipe Selection_DB". Mix_Temp  "Recipe Selection_DB". Mix_Temp_Tol  IN1  "Recipe Selection_DB". Mix_Temp_Tol	

llogue Output_Conveyor_S neral		12		<b>-</b>		D.				22
ne Analogue Out or_Speed	put_Convey- Nu	ımber 12		Туре	D	)B		Langua	ige	DB
mbering Automatic ormation										
2		ithor		Comment				Family		
0.1		er-defined ID							-	
ne	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comme	nt
nput					UA					
OP	Real	0.0	False	True		True	False			be output to D/A
HR	Real	4.0	False			True	False			m Value of Output
LR Dutput	Real	8.0	False	True	irue	True	False		iviinimui	m Value of Output
Channel Address	Int	0	False	True	True	True	False		D/A Cha	nnel Address
HRexceeded	Bool	0	False	True		True	False			gnal Out of Upper Range
LRexceeded	Bool	0	False	True		True	False			gnal Out of Lower Range
nOut Static										-

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Program blocks	

Valve_Bottle_	_Fill(V103)	[DB13]
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Valve_Bottle_Fil	Valve_Bottle_Fill(V103) Properties									
General										
Name	Valve_Bottle_Fill(V103)	Number	13	Туре	DB	Language	DB			
Numbering	Automatic									
Information										
Title		Author		Comment		Family				
Version	0.1	User-defined ID								

Name	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>▼</b> Input									
Valve_Sens_Open	Bool	false	False	True	True	True	False		Valve Sensor State: Open
Valve_ Sens_ Closed	Bool	false	False	True	True	True	False		Valve Sensor State: Closed
Level_Ok	Bool	false	False	True	True	True	False		Tank Sensor: Level OK
Valve_Opn_Req	Bool	false	False	True	True	True	False		Valve Open Request Input
Manual_mode	Bool	false	False	True	True	True	False		Manual Mode requested
▼ Output									
Valve_Control	Bool	false	False	True	True	True	False		Valve Control. (True=Open ; False=Close)
Valve_Error	Bool	false	False	True	True	True	False		Valve Error Status
InOut									
▼ Static									
OpenTimer	DInt	0	False	True	True	True	False		
CloseTimer	DInt	0	False	True	True	True	False		

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# Valve\_ProdA(V101) [DB14]

Valve_ProdA(V	01) Properties						
General							
Name	Valve_ProdA(V101)	Number	14	Туре	DB	Language	DB
Numbering	Automatic						
Information							
Title		Author		Comment		Family	
Version	0.1	User-defined ID					

Name	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>▼</b> Input									
Valve_Sens_Open	Bool	false	False	True	True	True	False		Valve Sensor State: Open
Valve_ Sens_ Closed	Bool	false	False	True	True	True	False		Valve Sensor State: Closed
Level_Ok	Bool	false	False	True	True	True	False		Tank Sensor: Level OK
Valve_Opn_Req	Bool	false	False	True	True	True	False		Valve Open Request Input
Manual_mode	Bool	false	False	True	True	True	False		Manual Mode requested
▼ Output									
Valve_Control	Bool	false	False	True	True	True	False		Valve Control. (True=Open ; False=Close)
Valve_Error	Bool	false	False	True	True	True	False		Valve Error Status
InOut									
▼ Static									
OpenTimer	DInt	0	False	True	True	True	False		
CloseTimer	DInt	0	False	True	True	True	False		

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Program blocks	

# Valve\_ProdB(V102) [DB7]

Valve_ProdB(V102) Properties									
General									
Name	Valve_ProdB(V102)	Number	7	Туре	DB	Language	DB		
Numbering	Automatic								
Information									
Title		Author		Comment		Family			
Version	0.1	User-defined ID							

Name	Data type	Start value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
<b>▼</b> Input									
Valve_Sens_Open	Bool	false	False	True	True	True	False		Valve Sensor State: Open
Valve_ Sens_ Closed	Bool	false	False	True	True	True	False		Valve Sensor State: Closed
Level_Ok	Bool	false	False	True	True	True	False		Tank Sensor: Level OK
Valve_Opn_Req	Bool	false	False	True	True	True	False		Valve Open Request Input
Manual_mode	Bool	false	False	True	True	True	False		Manual Mode requested
▼ Output									
Valve_Control	Bool	false	False	True	True	True	False		Valve Control. (True=Open ; False=Close)
Valve_Error	Bool	false	False	True	True	True	False		Valve Error Status
InOut									
<b>▼</b> Static									
OpenTimer	DInt	0	False	True	True	True	False		
CloseTimer	DInt	0	False	True	True	True	False		

# Filling Control [FB6]

Filling Control Properties								
General								
Name	Filling Control	Number	6	Туре	FB	Language	SCL	
Numbering	Automatic							
Information								
Title		Author		Comment		Family		
Version	0.1	User-defined ID						

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comment
▼ Input									
Trigger	Bool	false	Non-retain	True	True	True	False		
Level	Real	0.0	Non-retain	True	True	True	False		
Unit Size	Int	0	Non-retain	True	True	True	False		
▼ Output									
Target_Lvl	Real	0.0	Non-retain	True	True	True	False		
InOut									
Static									
Temp									
Constant									

```
// Filling Process Control - The Function will calculate the new tank level target
// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

// according to to the size per unit for every trigger.

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// according to to the size per unit for every trigger.

// according trigger.

// according trigger.

// according tri
```

Symbol	Address	Туре	Comment
#"Unit Size"		Int	
#Level		Real	
#Target_Lvl		Real	
#Trigger		Bool	

lling Control_DB Properties eneral											
ame Filling Contro	I_DB Num	nber 8		Туре	D	В		Langua	age	DB	
umbering Automatic formation											
tle ersion 0.1	Auth User	or -defined ID		Comment				Family			
me	Data type	Start value	Retain	Accessible	Writ-	· Visible in	Setpoint	Supervi-	Comme	ent	
	Data type	Start Value	No tum	from	able	HMI engi- neering	эсгропп	sion			
				UA	HMI/	1					
					OPC UA						
Input	_			_							
Trigger Level	Bool Real	false 0.0	False False			True True	False False				
Unit Size	Int	0	False			True	False				
Output											
Target_Lvl	Real	0.0	False	True	True	True	False				
InOut Static											

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## **Program blocks**

## **Error\_Tolerance** [FB9]

Error_Tolerance Properties								
General								
Name	Error_Tolerance	Number	9	Туре	FB	Language	SCL	
Numbering	Automatic							
Information								
Title		Author		Comment		Family		
Version	0.1	User-defined ID						

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering		Supervi- sion	Comment
▼ Input									
Product_1	Int	0	Non-retain	True	True	True	False		
Product_2	Int	0	Non-retain	True	True	True	False		
Prod1_Tolerance	Int	0	Non-retain	True	True	True	False		
Prod2_Tolerance	Int	0	Non-retain	True	True	True	False		
Value_Read	Real	0.0	Non-retain	True	True	True	False		
Reset	Bool	false	Non-retain	True	True	True	False		
Output									
Error_Output	Bool	false	Non-retain	True	True	True	False		
InOut									
<b>▼</b> Static									
TimerError	DInt	0	Non-retain	True	True	True	False		
<b>▼</b> Temp									
Error_level	Bool								
Temp_Value	Int								
Constant									

```
0001 // Function manages the tolerance level error between two products.
0002 //Product 1 Tolerance Level Error Management.
0003
     IF #Value_Read > #Product_1 + #Prod1_Tolerance THEN
0004
     #Temp_Value := #Product_1 + #Prod1_Tolerance;
0005
     #Error_level:=1;
0006
     ELSIF #Value_Read < #Product_1 - #Prod1_Tolerance THEN</pre>
0007
      #Temp_Value := #Product_1 + #Prod1_Tolerance;
8000
        #Error_level := 1;
0009
0010
     //Product 2 Tolerance Level Error Management.
0011
     IF #Value_Read > #Temp_Value + #Product_2 + #Prod2_Tolerance THEN
0012
      #Error level := 1;
0013
     ELSIF #Value_Read < #Temp_Value + #Product_2 - #Prod2_Tolerance THEN</pre>
0014
      #Error_level := 1;
0015
0016
     //If and Error in the level is triggered the system has 30s to stabilise or reach level
0017
     //IF #Error level = 1 AND #Reset=0 THEN
0018
      // #TimerError := #TimerError + 1;
0019
     // IF #TimerError >= 30 THEN
0020
     // #Error_Output := 1;
0021
          //If Reset triggered then reset timer.
0022
     // ELSIF #Reset = 1 OR #Error_level = 0 THEN
0023
     // #TimerError := 0;
0024
     // END IF;
0025
      // END_IF;
```

Symbol #Error_level	Address	Туре	Comment
#Error_level		Bool	
#Prod1_Tolerance		Int	
#Prod2_Tolerance		Int	
#Product_1		Int	
#Product_2		Int	
#Prod1_Tolerance  #Prod2_Tolerance  #Product_1  #Product_2  #Temp_Value  #Value_Read		Int	
#Value_Read		Real	

neral	e_ProductAan											
me	Error_Tolerar tAandB	nce_Produc-	lumber	17		Туре	D	)B		Langua	ige	DB
mbering ormation	Automatic											
e			uthor			Comment				Family		
rsion	0.1	L	Iser-defined ID	)								
me		Data type	Start va	llue	Retain	Accessible from HMI/OPC UA	able from HMI/ OPC	- Visible in HMI engi- neering	Setpoint	Supervi- sion	Comme	nt
Input							UA					
Product_		Int	0		False	True		True	False			
Product_	.2	Int	0		False	True		True	False			
Prod1_To		Int	0		False	True		True	False			
Prod2_To		Int	0		False	True		True	False			
Value_Re	ead	Real	0.0		False	True		True	False			
Reset		Bool	false		False	True	irue	True	False			
Output							-					
Error_Ou	itput	Bool	false		False	True	True	True	False			
nOut												
Static TimerErro		DInt	0		False	True	-	True	False			

## Program blocks / System blocks / Program resources

## PID\_Compact [FB1130]

DID Compact B	roportios								
PID_Compact Properties									
General									
Name	PID_Compact	Number	1130	Type	FB	Language	LAD		
Numbering	Automatic								
Information									
Title	Compact PID_Controller with self-tuning	Author	SIMATIC	Comment		Family			
Version	1.2	User-defined ID	PID_Cmpt						

Name	Data type	Default value	Retain	Accessible from HMI/OPC UA	able	Visible in HMI engi- neering	Setpoint	Supervi- sion	Comment
▼ Input									
Setpoint	Real	0.0	Non-retain	True	True	True	False		controller setpoint input
Input	Real	0.0	Non-retain	True	True	True	False		actual value of process as REAL
Input_PER	Word	16#0	Non-retain	True	True	True	False		actual value of process from periphery
ManualEnable	Bool	false	Non-retain	True	True	True	False		activate manual input to overwrite output
ManualValue	Real	0.0	Non-retain	True	True	True	False		input for manual value
Reset	Bool	false	Non-retain	True	True	True	False		reset the controller
▼ Output									
ScaledInput	Real	0.0	Non-retain	True	True	True	False		scaled peripheral input value from process
Output	Real	0.0	Non-retain	True	True	True	False		output value in REAL format
Output_PER	Word	16#0	Non-retain	True	True		False		output value in peripheral format
Output_PWM	Bool	false	Non-retain	True	True	True	False		pulse width modulated output value
SetpointLimit_H	Bool	false	Non-retain	True	True	True	False		setpoint is limited at highest level
SetpointLimit_L	Bool	false	Non-retain	True	True	True	False		setpoint is limited at lowest level
InputWarning_H	Bool	false	Non-retain	True	True	True	False		input value exceeded high warning level
InputWarning_L	Bool	false	Non-retain	True	True	True	False		input value exceeded low warning level
State	Int	0	Non-retain	True	True	True	False		status of controller (0=Inactive,1=SUT,2=TIR,3=Automatic,4=Hand)
Error	DWord	16#0	Non-retain	True	True	True	False		error message from control- ler
InOut									
<b>▼</b> Static									
sd VersionID	DWord	DW#16#01020002	Non-retain	True	True	True	False		version of controller
sb_ResOld	Bool	false	Non-retain	False	False		False		internal
sb_TMBeginExec	Bool	false	Non-retain	False	False		False		internal
sb_GetCycleTime	Bool	true	Non-retain	True	True		False		start automatic estimation
sb_EnCyclEstimation	Bool	true	Non-retain	True	True		True		of call cycle time enable estimation of call cy-
sb_EnCyclMonitoring	Bool	true	Non-retain	True	True		True		cle time enable monitoring of call cy-
35_Encyclivionitioning	2001	liuc	TVOIT TE LUIT	Truc	ITUC	Truc	Truc		cle time
sb_Startup	Bool	false	Non-retain	False	False	False	False		internal
sb_RunModeByStartup	Bool	true	Non-retain	True	True	True	True		enable running last state be- fore reset or startup
sby_EsData_1	Byte	16#0	Non-retain	False	False	False	True		internal
sby_EsData_2	Byte	16#0	Non-retain	False	False	False	True		internal
si_TMCnt	Int	0	Non-retain	False	False	False	False		internal
si_Unit	Int	0	Non-retain	True	True	True	True		unit of actual value
si_Type	Int	0	Non-retain	True	True	True	True		type of controller
si_SveModeByRes	Int	0	Non-retain	False	False	False	False		internal
sd_Warning	DWord	16#0	Non-retain	True	True		False		warning message from controller
st_TMEnd	Time	T#0MS	Non-retain	False	False	False	False		internal
sr_TMDiff	Real	0.0	Non-retain	False	False	False	False		internal
sr_TMDiffMax	Real	0.0	Non-retain	False	False	False	False		internal
sr_TMDiffMaxMed	Real	0.0	Non-retain	False	False	False	False		internal
sr_TMDiffSum	Real	0.0	Non-retain	False	False		False		internal
▼ sBackUp	Struct		Non-retain	True	True		False		saved parameter set
<u> </u>		1.0							·
r_Gain	Real	1.0	Non-retain	True	True		True		saved proportional gain
r_Ti	Real	20.0	Non-retain	True	True		True		saved integration time
r_Td	Real	0.0	Non-retain	True	True		True		saved derivative time
r_A	Real	0.0	Non-retain	True	True	True	True		saved filter coefficient for derivative part

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ie	Data type	Default value	Retain	Accessible from HMI/OPC UA	Writ- Visible in able HMI engi- from neering HMI/ OPC UA		Supervi- sion	Comment
r_B	Real	0.0	Non-retain	True	True True	True		saved weigthing of pro tional part in direct, fee back path
r_C	Real	0.0	Non-retain	True	True True	True		saved weigthing of der tive part in direct, feedl path
r_Cycle	Real	1.0	Non-retain	True	True True	True		saved cycle time of con ler part
▼ sPid_Calc	Struct		Non-retain	True	True True	False		self tuning data
r_Cycle	Real	0.1	Non-retain	True	True True	True		call cycle time
r_Resol	Real	1.0	Non-retain	False	False False	False		internal
b_Ctrln b_Switch_On	Bool Bool	false false	Non-retain Non-retain	False False	False False False False	False False		internal internal
b_Switch_Off	Bool	false	Non-retain	False	False False	False		internal
b_Jump_On	Bool	false	Non-retain	False	False False	False		internal
b_Jump_Off	Bool	false	Non-retain	False	False False	False		internal
b_Jump	Bool	false	Non-retain	False	False False	False		internal
b_CalcOn	Bool	false	Non-retain	False	False False	False		internal
b_SpCrossed	Bool	false	Non-retain	False	False False	False		internal
b_PvFilAdapt	Bool	false	Non-retain	False	False False	False		internal
b_2StepDeadTm	Bool	false	Non-retain	False	False False	False		internal
b_LastPeriod	Bool	false	Non-retain	False	False False	False		internal
b_Part1	Bool	false	Non-retain	False	False False	False		internal
b_Part2	Bool	false	Non-retain	False	False False	False		internal
b_RunIn	Bool	false	Non-retain	True	True True	False		forced run in setpoint
b_FrstDerivRdy	Bool	false	Non-retain	False	False False	False		internal
b_SpOffLtd b_TimeAdapt	Bool Bool	false false	Non-retain Non-retain	False False	False False False False	False False		internal internal
b_CalcParamSUT	Bool	false	Non-retain	True	True True	False		recalculate parameters startup tuning
b_CalcParamTIR	Bool	false	Non-retain	True	True True	False		recalculate parameters tuning in run
i_CtrlTypeSUT	Int	0	Non-retain	True	True True	True		tuning rule for SUT (0-0 PID,1-CHR PI)
i_CtrlTypeTIR	Int	0	Non-retain	True	True True	True		tuning rule for TIR (0-2 auto,fast,slow;3-ZN PIE ZN PI;5-ZN P)
i_WPCyclMax	Int	0	Non-retain	False	False False	False		internal
i_WPCycl	Int	0	Non-retain	False	False False	False		internal
i_FilCyc	Int	0	Non-retain	False	False False	False		internal
i_MaxPeriod	Int	0	Non-retain	False	False False	False		internal
i_Ev4Step	Int	0	Non-retain	False	False False	False		internal
i_RepeatProc	Int	0	Non-retain	False	False False	False		internal
i_CntPeriod	Int Int	0	Non-retain Non-retain	False False	False False False False	False False		internal internal
i_CtrlValAdapt i_Counter4	Int	0	Non-retain	False	False False	False		internal
d_Counter1	DInt	0	Non-retain	False	False False	False		internal
d_Counter2	DInt	0	Non-retain	False	False False	False		internal
d_Counter3	DInt	0	Non-retain	False	False False	False		internal
d_CycCounter	DInt	0	Non-retain	False	False False	False		internal
d_CycCountEnd	DInt	0	Non-retain	False	False False	False		internal
d_TOn	DInt	0	Non-retain	False	False False	False		internal
d_TOff	DInt	0	Non-retain	False	False False	False		internal
d_TSum	DInt	0	Non-retain	False	False False	False		internal
d_TPnt1	DInt	0	Non-retain	False	False False	False		internal
d_THys	DInt	0	Non-retain	False	False False	False		internal
d_THysAlt	DInt	0	Non-retain	False	False False	False		internal
r_Medi	Real	0.0	Non-retain	False	False False	False		internal
r_Pv0	Real	0.0	Non-retain	False	False False	False		internal
r_PvAlt	Real	0.0	Non-retain	False	False False	False		internal
r_PvAlt2	Real Real	0.0	Non-retain Non-retain	False False	False False False False	False False		internal internal
r_PvAltSUT r_PvMedi	Real	0.0	Non-retain	False	False False	False		internal
r_PvMedi r_LmnFilOld1	Real	0.0	Non-retain	False	False False	False		internal
r_LmnFilOld2	Real	0.0	Non-retain	False	False False	False		internal
r_Stabw_Pv_1	Real	0.0	Non-retain	False	False False	False		internal
r_Stabw_Pv_2	Real	0.0	Non-retain	False	False False	False		internal
r_SpAlt	Real	0.0	Non-retain	False	False False	False		internal
r_Time	Real	0.0	Non-retain	False	False False	False		internal
r_PvDxMax	Real	0.0	Non-retain	False	False False	False		internal
r_TDxMax	Real	0.0	Non-retain	False	False False	False		internal
r_Noise	Real	0.0	Non-retain	False	False False	False		internal
r_Noise2	Real	0.0	Non-retain	False	False False	False		internal
r_Dx0	Real	0.0	Non-retain	False	False False	False		internal
r_Dx	Real	0.0	Non-retain	False	False False	False		internal
	Real	0.0	Non-retain	False	False False	False		internal
r_Dx2 r_DxMax	Real	0.0	Non-retain	False	False False	False		internal

Totally Integrated	
<b>Automation Portal</b>	

e	Data type	Default value	Retain	Accessible from HMI/OPC UA	Writ- Visible in able HMI engi- from neering HMI/ OPC UA	Setpoint	Supervi- sion	Comment
r_DxMax2	Real	0.0	Non-retain	False	False False	False		internal
r_DiffDx	Real	0.0	Non-retain	False	False False	False		internal
r_DiffDx2	Real	0.0	Non-retain	False	False False	False		internal
r_Break	Real	100.0	Non-retain	False	False False	False		internal
r_BreakTm	Real	0.0	Non-retain	False	False False	False		internal
r_X1	Real	0.0	Non-retain	False	False False	False		internal
r_X2	Real	0.0	Non-retain	False	False False	False		internal
					False False	False		
r_Up	Real	0.0	Non-retain	False				internal
r_Down	Real	0.0	Non-retain	False	False False	False		internal
r_Switch	Real	0.0	Non-retain	False	False False	False		internal
r_AKrit	Real	0.0	Non-retain	False	False False	False		internal
r_DKrit	Real	0.0	Non-retain	False	False False	False		internal
r_LmnOpt	Real	0.0	Non-retain	False	False False	False		internal
r_ErOld	Real	0.0	Non-retain	False	False False	False		internal
r_TRelOld	Real	1.0	Non-retain	False	False False	False		internal
	Real	0.0	Non-retain	False	False False	False		internal
r_StdAbw								
r_Lmn0	Real	0.0	Non-retain	False	False False	False		internal
r_LmnFacLim	Real	0.0	Non-retain	False	False False	False		internal
r_Lmn1	Real	0.0	Non-retain	False	False False	False		internal
r_Sp1	Real	0.0	Non-retain	False	False False	False		internal
r_SpOff	Real	1.0	Non-retain	False	False False	False		internal
r_SHys	Real	0.0	Non-retain	False	False False	False		internal
r_Progress	Real	0.0	Non-retain	True	True True	False		current progress in per
	Struct	0.0	Non-retain	True	True True	False		data of controling part
sPid_Cmpt								
r_Sp_Hlm	Real	3.402822e+38	Non-retain	True	True True	True		setpoint high limit
r_Sp_Llm	Real	-3.402822e+38	Non-retain	True	True True	True		setpoint low limit
r_Pv_Norm_IN_1	Real	0.0	Non-retain	True	True True	True		low value (input range
								scaling)
r_Pv_Norm_IN_2	Real	27648.0	Non-retain	True	True True	True		high value (input range scaling)
r_Pv_Norm_OUT_1	Real	0.0	Non-retain	True	True True	True		low value (output rang scaling)
r_Pv_Norm_OUT_2	Real	100.0	Non-retain	True	True True	True		high value (output ran scaling)
r_Lmn_Hlm	Real	100.0	Non-retain	True	True True	True		output value high limit
r_Lmn_Llm	Real	0.0	Non-retain	True	True True	True		output value low limit
b_Input_PER_On	Bool	true	Non-retain	True	True True	True		activate actual value of
b_LoadBackUp	Bool	false	Non-retain	True	True True	False		ess from periphery restore last saved param
b_InvCtrl	Bool	false	Non-retain	True	True True	True		record activate control inversi
r_Lmn_Pwm_PPTm	Real	0.0	Non-retain	True	True True	True		PWM minimum on time
r_Lmn_Pwm_PBTm	Real	0.0	Non-retain	True	True True	True		PWM minimum off tim
r_Man	Real	0.0	Non-retain	False	False False	False		internal
		false	Non-retain	False	False False	False		
b_ManOn	Bool							internal
b_Sync	Bool	false	Non-retain	False	False False	False		internal
b_PIDInit	Bool	false	Non-retain	False	False False	False		internal
d_Per	DInt	0	Non-retain	False	False False	False		internal
d_Per2	DInt	0	Non-retain	False	False False	False		internal
r_PvSum	Real	0.0	Non-retain	False	False False	False		internal
r_Pv_Hlm	Real	120.0	Non-retain	True	True True	True		input value high limit
r_Pv_Llm	Real	0.0	Non-retain	True	True True	True		input value low limit
	Real	3.402822e+38	Non-retain	True	True True	True		input value warn level
r_Pv_HWrn								<u> </u>
r_Pv_LWrn	Real	-3.402822e+38	Non-retain	True	True True	True		input value warn level
r_Ctrl_IntHlm	Real	3.402822e+38	Non-retain	False	False False	False		internal
r_Ctrl_IntLlm	Real	-3.402822e+38	Non-retain	False	False False	False		internal
r_Ctrl_IOutv	Real	0.0	Non-retain	True	True True	False		signal of integral part
r_Ctrl_IRest	Real	0.0	Non-retain	False	False False	False		internal
r_Ctrl_DRest	Real	0.0	Non-retain	False	False False	False		internal
r_Ctrl_DRueck	Real	0.0	Non-retain	False	False False	False		internal
d_Lmn_Pwm_Ptm	DInt	0.0	Non-retain	False	False False	False		internal
		0.0			False False	False		
r_Lmn_Pwm_Rest	Real		Non-retain	False				internal
r_Lmn_Outv	Real	0.0	Non-retain	False	False False	False		internal
d_Lmn_Per_Outv	DInt	0	Non-retain	False	False False	False		internal
r sParamCalc	Struct		Non-retain	True	True True	False		data for recalculating prameters
b_SecndSetp	Bool	false	Non-retain	False	False False	False		internal
i_Event_SUT	Int	0	Non-retain	True	True True	False		current phase of start utuning
i_Event_TIR	Int	0	Non-retain	True	True True	False		current phase of tuning
r_Tu	Real	0.0	Non-retain	False	False False	False		internal
r_DxMaxSUT	Real	0.0	Non-retain	False	False False	False		internal
 r_Ks	Real	0.0	Non-retain	False	False False	False		internal
r_TKrit	Real	0.0	Non-retain	False	False False	False		internal
	Real	0.0	Non-retain	False	False False	False		internal
r KKrit			rion retuin	. 4.50		. 4.50	1	
r_KKrit r_LmnSUT	Real	0.0	Non-retain	False	False False	False		internal

me	Data type	Default value	Retain	from HMI/OPC UA	able from HMI/ OPC UA	HMI engi- neering		Supervi- sion	Comment
<b>▼</b> sRet	Struct		Retain	True	True		False		retain data
b_EnableManOld	Bool	false	Retain	False	False	False	False		internal
i_Mode	Int	0	Retain	True	True	True	True		set to change status (0=Ir active;1=SUT;2=TIR;3=Au matic;4=Hand)
i_ModeOld	Int	0	Retain	False	False	False	False		internal
i_SveModeByEnMan	Int	0	Retain	False		False	False		internal
i_StateOld	Int	0	Retain	False		False	False		internal
r_Ctrl_Gain	Real	1.0	Retain	True	True		True		actual proportional gain
	Real	20.0	Retain	True	True		True		actual integration time
r_Ctrl_Ti	Real	0.0	Retain	True	True		True		actual derivative time
r_Ctrl_Td									
r_Ctrl_A	Real	0.0	Retain	True	True	True	True		actual filter coefficient fo derivative part
r_Ctrl_B	Real	0.0	Retain	True	True	True	True		actual weigthing of proportional part in direct, feed-
r_Ctrl_C	Real	0.0	Retain	True	True	True	True		back path actual weigthing of derive
r Ctrl Cyclo	Real	1.0	Retain	True	True	Truo	True		tive part in direct, feedba path actual cycle time of contr
r_Ctrl_Cycle	Redi	1.0	Retaili	True	True	True	True		ler part

xing_Timer neral me	Mixing_Timer	Nu	mber	11		Туре	D	В		Langu	age	DB
ımbering	Automatic	ITG	mber			Турс		ь		Langu	age	DU
formation tle ersion	1.0		thor er-defined II	Simatic  D IEC_TMR		Comment				Family	1	IEC
ame		Data type	Start v	alue	Retain	Accessible from HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Comm	nent
<b>▼</b> Static												
PT		Time	T#0ms		False	True	True		False			
ET IN		Time Bool	T#0ms false		False False	True True	False True		False False			
IIN			Taise		i disc							
Q		Bool	false		False	True	False	True	False			
Q		Bool	false		False	True	False	True	False			
Q		Bool	false		False	True	False	True	False			

Totally Integ Automation							
Program	blocks / System b	locks / Prog	gram resources				
Bottle_Pro	duced_UP [DB15]						
Bottle_Produce	d_UP Properties						
General							
Name	Bottle_Produced_UP	Number	15	Туре	DB	Language	DB
Numbering	Automatic					1	
Information	·						
Title		Author	Simatic	Comment		Family	IEC
Version	1.0	User-defined ID	CNTR		·		

lame	Data type	Start value	Retain		able	HMI engi- neering		Supervi- sion	Comment
<b>▼</b> Static									
CU	Bool	false	True	True	True	True	False		
CD	Bool	false	True	True	True	True	False		
R	Bool	false	True	True	True	True	False		
LD	Bool	false	True	True	True	True	False		
QU	Bool	false	True	True	True	True	False		
QD	Bool	false	True	True	True	True	False		
PV	Int	0	True	True	True	True	False		
CV	Int	0	True	True	True	True	False		

r [DB16]  Derties  Purge_Timer Automatic  1.0	Num Auth User-		16 Simatic		Туре	DI	В	_	Langua	<b>30</b>	DD.
Purge_Timer Automatic	Auth User-	or			Туре	DI	В		Langua	ao.	DD
Automatic	Auth User-	or			Туре	DI	В		Langua	ao	DD
1.0	User-		Simatic						Langua	ge	DB
1.0	User-		Simatic						-		
1.0		delilled ib			Comment				Family		IEC
	Data type										
		Start val	ıe	Retain	HMI/OPC UA	able	HMI engi- neering	Setpoint	Supervi- sion	Commer	nt
	Time	T#0ms		False				False			
	Time	T#0ms		False							
			Time T#0ms Bool false	Time T#0ms Bool false	Time T#0ms False Bool false False	Time T#0ms False True Bool false False True	Time T#0ms False True False Bool false False True True	Time T#0ms False True False True  Bool false False True True True	Time T#0ms False True False True False  Bool false False True True False	Time T#0ms False True False True False  Bool false False True True True False	Time T#0ms False True False True False  Bool false False True True True False

ner_Conveyor Properties neral me	er_Conveyor [DI		s / Program res	04.000							
Mumber   19											
Author User-defined ID   EC_TMR   Family   EC    Start value   Retain   HMI/OPC   UA   UA   UA   UA   UA   UA   UA   U	eral										
Author   User-defined ID   IEC_TMR	<b>bering</b> Automatic	eyor Numb	er   19		Туре	D	В		Langu	age	DB
Train 1.0 User-defined ID   IEC_TMR   Retain   Accessible   Mrit-   Visible in   HMI engi-   Neering   Nee		Autho	or Simatic		Comment				Family	,	IEC
from HMI/OPC UA Sion Static  PT Time T#0ms False True True False IN Bool false False True True True False  True False  True False  True False											
False True True False  IN Bool false False True True True False  True True False  True False  True False  True False  True False  True False	2	Data type	Start value	Retain	from HMI/OPC	able from HMI/ OPC	HMI engi- neering	Setpoint	Supervi- sion	Comme	nt
ET Time T#0ms False True False True False IN Bool false False True True False	tatic										
IN Bool false False True True False											
						_					
Q Bool false False True False True False   Fal											

Delay_Timer Automatic  1.0		Author User-defined II	Simatic D IEC_TMR		Type Comment	D	В		Langua	age	DB
Automatic		User-defined II									
1.0		User-defined II			Comment						
1.0		User-defined II			Comment						u.e.o
11.0			J ILC_TIVIK						Family		IEC
	Data typ	e Start va									
			alue	Retain	from	able	Visible in HMI engi- neering	Setpoint	Supervi- sion	Commer	nt
	Time	T#0ms		False	True			False			
		Time Time Bool Bool	Time T#0ms Bool false	Time T#0ms Bool false	Time T#0ms False Bool false False	Time T#0ms False True Bool false False True	Time T#0ms False True False Bool false False True True	Time T#0ms False True False True  Bool false False True True True	Time T#0ms False True False True False Bool false False True True True False	Time T#0ms False True False True False  Bool false False True True True False	Time T#0ms False True False True False  Bool false False True True False