Energy_Drink_V15.1 / ENERGY_DRINK_PROC [CPU 314C-2 PN/DP] / Program blocks / FBs

GENERIC_VALVE [FB1]

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

GENERIC_VALVE

Name	Data type	Offset	Default value	Accessible from HMI/OPC UA	Writable from HMI/OPC UA	Visible in HMI engineering	Setpoint	Supervision	Comment
▼ Input									
Valve_Cmd	Bool	0.0	false	True	True	True	False		Enable valve command
Valve_Closed_Sensor	Bool	0.1	false	True	True	True	False		Valve closed position
Valve_Opened_Sensor	Bool	0.2	false	True	True	True	False		Valve opened position
Feedback_Type	Int	2.0	0	True	True	True	False		"0" = No feedback / "1"= Single disFeedback / "2"= Single En-Feedback / "3" = Double Feed-back / "4" = Proportional
Actuation_Type	Int	4.0	0	True	True	True	False		
Max_Lim	Real	6.0	0.0	True	True	True	False		
Min_Lim	Real	10.0	0.0	True	True	True	False		
PV	Real	14.0	0.0	True	True	True	False		
▼ Output									
Open_Valve_Cmd	Bool	18.0	false	True	True	True	False		
Close_Valve_Cmd	Bool	18.1	false	True	True	True	False		
Valve_Feedback	Bool	18.2	false	True	True	True	False		"1" If the valve is open, "0" otherwise
Valve_Alarm	Bool	18.3	false	True	True	True	False		
Vlv_Control_Cmd	Int	20.0	0	True	True	True	False		
%_Vlv_Opened	DInt	22.0	0	True	True	True	False		
InOut									
▼ Static									
M_Vlv_Closed	Bool	26.0	false	True	True	True	False		
M_Vlv_Opened	Bool	26.1	false	True	True	True	False		
Ret_Vlv	Word	28.0	16#0	True	True	True	False		
▼ Temp									
Temp_Process_Signal	Real	0.0							
▼ Constant									
No_Feedback	Int		0						
Single_En_Feedback	Int		1						
Single_Dis_Feedback	Int		2						
Double_Feedback	Int		3						
Proportional_Feedback	Int		4						
Single_Actuation	Int		1						
Double_Actuation	Int		2						
Proportional_Mode	Int		3						
Inverse_Mode	Int		4						
Control_Loop	Int		5						

```
0001 (*
0002 *File: FB GENERIC VALVE
0003 * Author: Jaime Calvente Mieres
0004 * Date: 18-05-2022
0005 * Description: This FB will be used to control a valve. Depending on
0006  the users input, the valve could act as Single actuation,
0007  Double actuation or Proportional mode.
0008 *)
0009
0010
0011
0012 (*This Case Statement will be used to map the process sensors to
0013 the internal variables used for the program logic, based on the
0014 Feedback Type or (Type of Valve) used in each process.*)
0015 REGION FEEDBACK_TYPE
0016
0017   CASE #Feedback_Type OF
0018
0019     #No_Feedback:
0020       ;
0021
0022     #Single_En_Feedback:
0023       #M_Vlv_Opened := #Valve_Opened_Sensor;
0024
0025     #Single_Dis_Feedback:
```

```
0026        #M_Vlv_Closed := #Valve_Closed_Sensor;
0027
0028      #Double_Feedback:
0029        #M_Vlv_Closed := #Valve_Closed_Sensor;
0030        #M_Vlv_Opened := #Valve_Opened_Sensor;
0031
0032      #Proportional_Feedback:
0033        #M_Vlv_Closed := #Valve_Closed_Sensor;
0034        #M_Vlv_Opened := #Valve_Opened_Sensor;
0035
0036      ELSE  // Statement section ELSE
0037        ;
0038    END_CASE;
0039
0040
0041  END_REGION
0042
0043
0044
0045
0046  // IF VALVE COMMAND ACTIVE
0047  IF #Valve_Cmd THEN
0048
0049  (*This Case Statement will be used to Set the type of Actuation will be used
0050  depending on the types of Valves the process has.*)
0051    REGION ACTUATION_TYPE
0052
0053      CASE #Actuation_Type OF
0054
0055          // SINGLE ACTUATION VALVES
0056        #Single_Actuation:
0057
0058          IF #Valve_Closed_Sensor THEN
0059            #Open_Valve_Cmd := true;
0060          END_IF;
0061
0062          // DOUBLE ACTUATION VALVES
0063        #Double_Actuation:
0064
0065          IF #M_Vlv_Closed THEN
0066            #Open_Valve_Cmd := true;
0067          ELSIF #M_Vlv_Opened THEN
0068            #Open_Valve_Cmd := false;
0069          END_IF;
0070
0071          (*
0072   PROPORTIONAL ACTUATION VALVES
0073  *)
0074
0075          // PROPORTIONAL MODE
0076        #Proportional_Mode:
0077          #Temp_Process_Signal := #PV;
0078          #Ret_Vlv := UNSCALE(IN := #Temp_Process_Signal, HI_LIM := #Max_Lim, LO_LIM := #Min_Lim, BIPOLAR := false, OUT
      => #Vlv_Control_Cmd);
0079          #"%_Vlv_Opened" := ROUND((#Vlv_Control_Cmd * 100.0) / 27648);
0080
0081          // INVERSE MODE
0082        #Inverse_Mode:
0083          #Temp_Process_Signal := #PV;
0084          #Ret_Vlv := UNSCALE(IN := #Temp_Process_Signal, HI_LIM := #Min_Lim, LO_LIM := #Max_Lim, BIPOLAR := false, OUT
      => #Vlv_Control_Cmd);
0085          #"%_Vlv_Opened" := ROUND((#Vlv_Control_Cmd * 100.0) / 27648);
0086
0087          // PID CONTROL MODE
0088        #Control_Loop:
0089          #Temp_Process_Signal := #PV;
0090          #Ret_Vlv := UNSCALE(IN := #Temp_Process_Signal, HI_LIM := #Max_Lim, LO_LIM := #Min_Lim, BIPOLAR := false, OUT
      => #Vlv_Control_Cmd);
0091          #"%_Vlv_Opened" := ROUND((#Vlv_Control_Cmd * 100.0) / 27648);
0092
0093      END_CASE;
0094
0095    END_REGION
0096
0097
0098
0099
0100  // IF NOT VALVE COMMAND
0101  ELSE
0102    // KEEP THE VALVE IN A CLOSED POSITION.
0103    #Open_Valve_Cmd := false;
0104    #Close_Valve_Cmd := true;
0105
0106    // IF VALVE ALREARY CLOSED => SET COMMAND TO "0"
0107    IF #M_Vlv_Closed THEN
0108      #Close_Valve_Cmd := false;
0109    END_IF;
0110
```

```
0111    // IF PROPORTIONAL MODES ACTIVE =>VALVE RETURN "0"
0112    #Vlv_Control_Cmd := 0;
0113    #"%_Vlv_Opened" := 0;
0114  END_IF;
0115
0116
0117
0118
0119
0120
0121
```

Symbol	Address	Type	Comment
#"%_Vlv_Opened"		DInt	
#Actuation_Type		Int	
#Close_Valve_Cmd		Bool	
#Control_Loop	5	Int	
#Double_Actuation	2	Int	
#Double_Feedback	3	Int	
#Feedback_Type		Int	"0" = No feedback / "1"= Single disFeedback / "2"= Single EnFeedback / "3" = Double Feedback / "4" = Proportional
#Inverse_Mode	4	Int	
#M_Vlv_Closed		Bool	
#M_Vlv_Opened		Bool	
#Max_Lim		Real	
#Min_Lim		Real	
#No_Feedback	0	Int	
#Open_Valve_Cmd		Bool	
#Proportional_Feedback	4	Int	
#Proportional_Mode	3	Int	
#PV		Real	
#Ret_Vlv		Word	
#Single_Actuation	1	Int	
#Single_Dis_Feedback	2	Int	
#Single_En_Feedback	1	Int	
#Temp_Process_Signal		Real	
#Valve_Closed_Sensor		Bool	Valve closed position
#Valve_Cmd		Bool	Enable valve command
#Valve_Opened_Sensor		Bool	Valve opened position
#Vlv_Control_Cmd		Int	