Application Note

FESTO

VEMD with Omron PLC through Modbus TCP

This Application note describes integrating the Festo Mass Flow Controller VEMD with Omron Sysmac PLCs through Modbus TCP in Sysmac Studio programming environment. The function block library is used to Control and Parameterize the connected VEMD.

VEMD-...-5YMPM1(D)

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1 Introduction

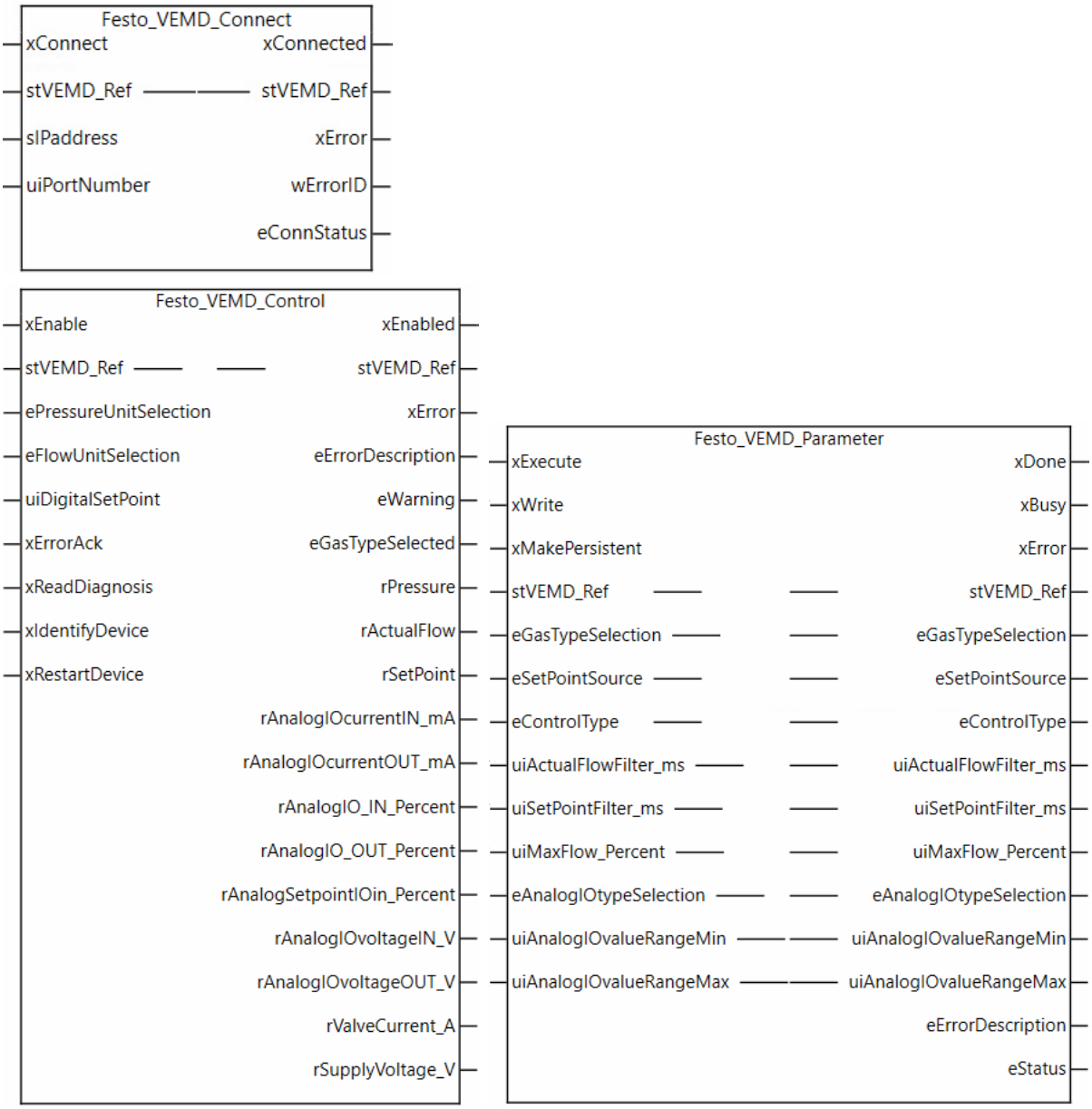
This application note explains the process for controlling and parameterizing the **VEMD** with an **Omron Sysmac PLC** through Modbus TCP using the **Festo_VEMD_MB** library. It also provides a step-by-step guide for creating a project along with instructions on how to use the library in Sysmac studio software environment, including sample code.

The library includes three main function blocks:

Festo_VEMD_Connect Establishes and closes a Modbus TCP connection with server(VEMD) and Passes the socket handle to control and parameter blocks.

Festo_VEMD_Control Manages and monitors the VEMD device: accepts control/configuration inputs (enable, unit selection, setpoint, diagnostics, identify, restart, error acknowledge) and outputs live status, measurements, and diagnostic data.

Festo_VEMD_Parameter is used to execute parameter read and write operations, allowing for the configuration and persistence of parameters while providing feedback on the status of these operations, including completion, ongoing processes, and error status.



1.1 Hardware Used

Device Name	Device Type	Version / Firmware
Omron Sysmac PLC	NJ301-1100	V1.18
Omron Power Supply Unit	NJ-PD3001	Version Free
VEMD-L-6-60-200-D9-G14-5YMPM1D-VA	8163830	V1.3.0.55
Ethernet Cable	-	Version Free

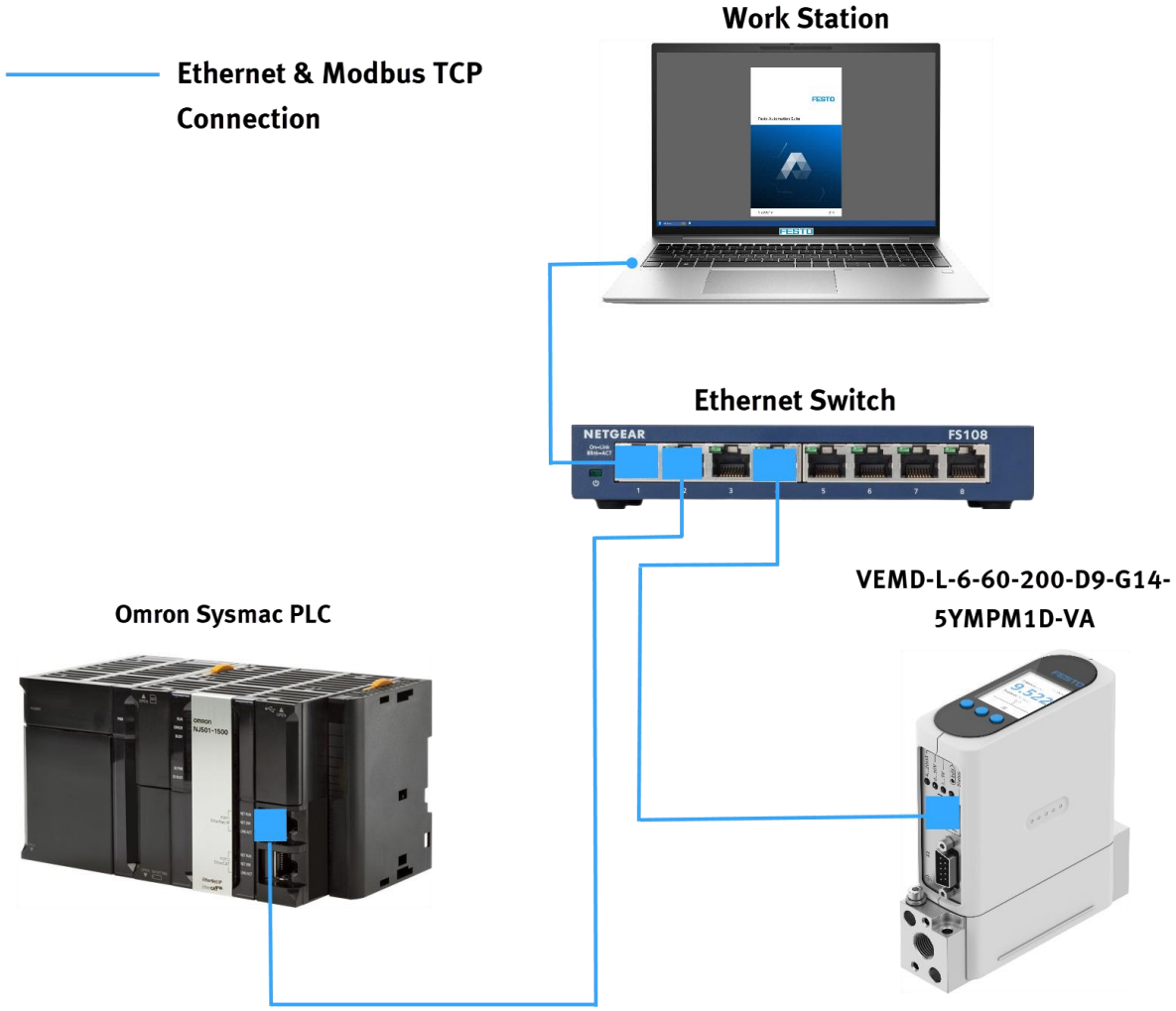
Table 1.1: Hardware used

1.2 Software Used

Software Name	Software Version
Omron Sysmac Studio	V1.66
Festo Automation Suite	V2.12.0.436
Library (Festo_VEMD_MB)	V1.66.10

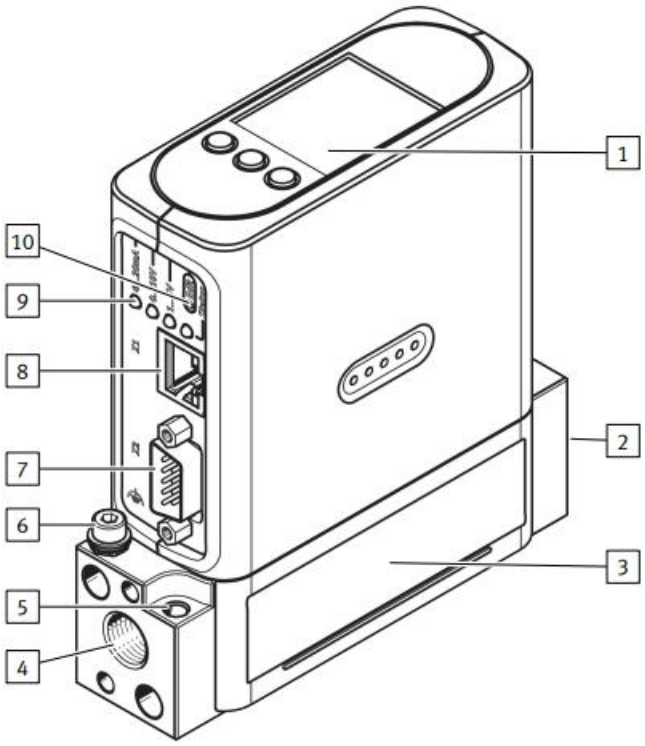
Table 1.2: Software used

1.3 Topology Overview



2 Hardware Configuration

2.1 VEMD-...-5YMPM1D Overview



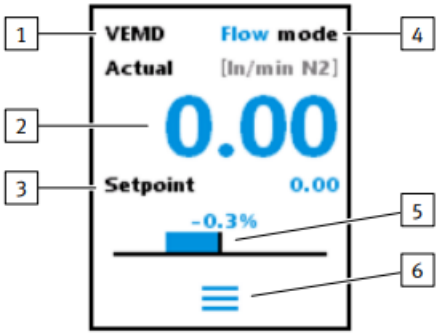
1 For VEMD-...-5YMPM1D: display with operating buttons
2 Pneumatic port 2
3 Product labelling showing flow direction
4 Pneumatic port 1
5 Mounting hole (2x)
6 Connection: functional earth
7 Connection [X2]: Sub-D
8 Connection [X1]: Ethernet
9 LED display
10 "Edit" pushbutton actuator

2.1.1 LED Indication

LED display

LED	Status	Meaning
4 ... 20 mA 0 ... 10 V 1 ... 5 V	green light	The type of analogue input signal and output signal.
Status	green light	– The power supply and media supply are switched on. – The product is ready for operation.
	orange light	Warning: – The pressure of medium is too high or too low. – The set valve flow or the flow specified by the product is too high for the current flow rate. The valve flow rate is therefore restricted to prevent overheating. – The flow direction is incorrect.
	red light	Error: – The product is defective.
	off	– The power supply is switched off. – The product is not ready for operation.

2.1.2 LED Indication



Start screen

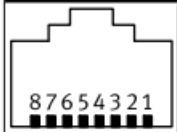
1. Product designation
2. Actual: actual value of flow rate with unit
3. Setpoint: setpoint value for flow rate
4. Flow mode: operating mode
5. Graphic display: difference between actual value and setpoint value of flow rate
6. Menu

Note

- Only available with VEMD-...-5YMPM1(**D),** where **D** stands for **Display.**

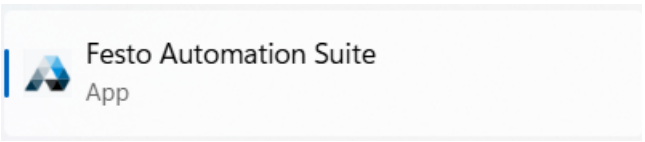
2.1.3 Connection Detail

Connection [X1]: Ethernet

Connection [X1]: Ethernet	Pin	Function	Description
	1	TX+	Transmitted data+
	2	TX–	Transmitted data–
	3	RX+	Received data+
	4	n. c.	Not connected
	5	n. c.	
	6	RX–	Received data–
	7	n. c.	Not connected
	8	n. c.	

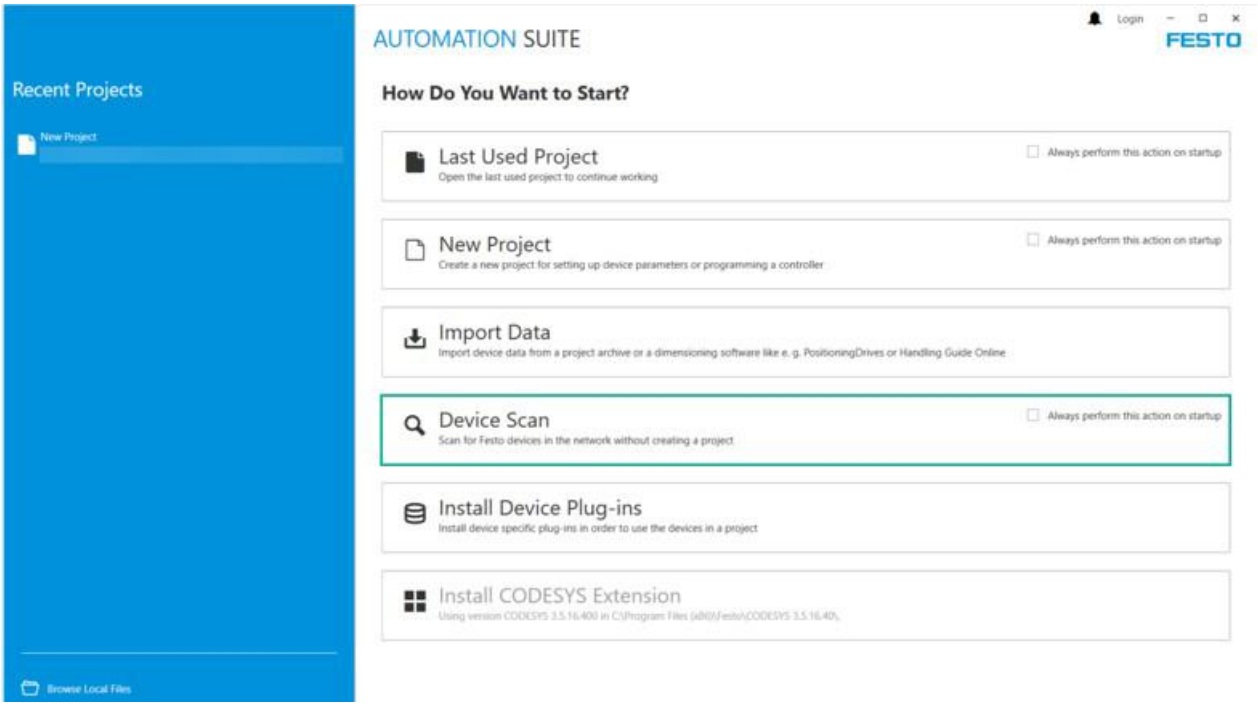
2.2 VEMD-...-5YMPM1D IP address Configuration

Step 1



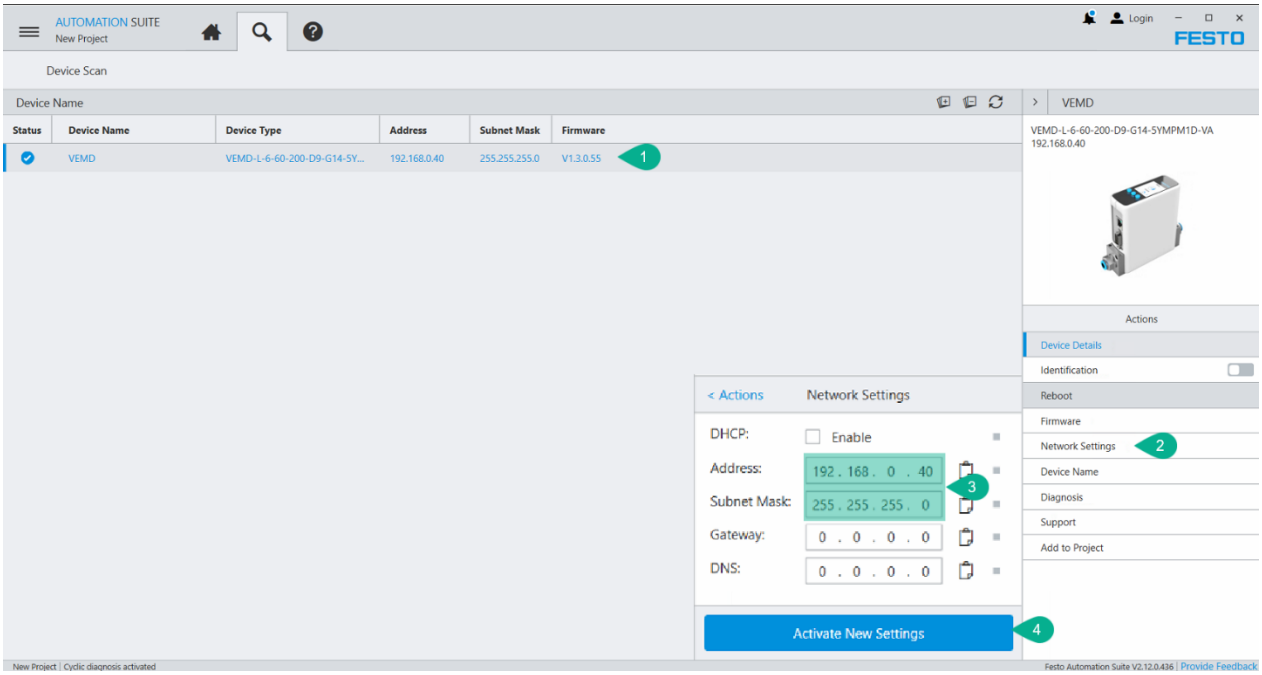
Open the **Festo Automation Suite** software **(Windows Start >>Festo Software >> Festo Automation Suite).**

Step 2



Click on **Device Scan** to detect and add devices to the current project.

Step 3



1. Select the **VEMD** from the **Device Scan**.
2. From the **Actions** menu on the right-hand side, select **Network Settings**.
3. Enter the **IP address** and **Subnet mask** according to the application requirements.
4. Click **Activate New Settings** to apply the changes.

3 Software Configuration

This chapter describes the configuration of Omron Sysmac Studio software, including creating a new project and adding the controller to the project, Adding **Festo_VEMD_MB** library to the project.

3.1 Create a New Project and Adding the Sysmac Controller to the Project

Step 1

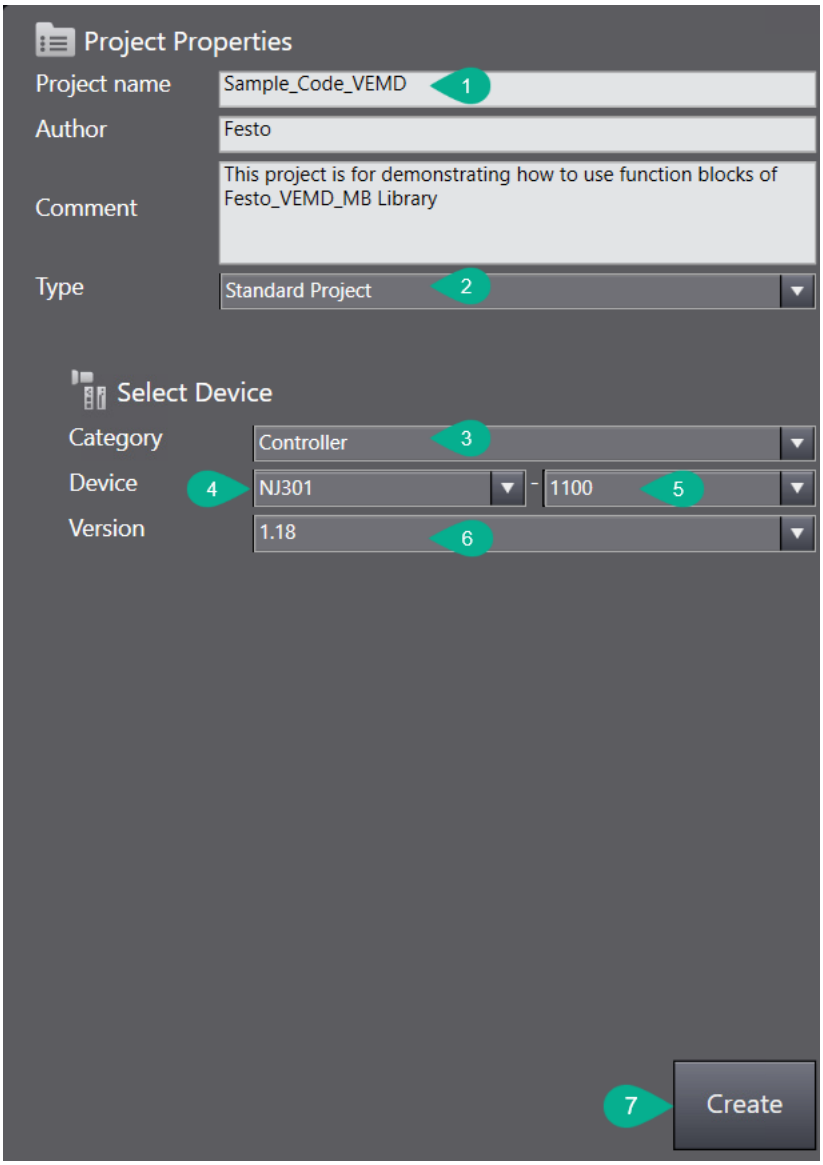


Open the **Sysmac Studio** software (**Windows Start >> Omron >> Launch Sysmac Studio**).

Step 2



Click on the **New Project** option to create a new project from **Start Page** of **Sysmac Studio** software.



1. Enter the required project name in the **Project name** box from the **Project Properties** window.
2. Select the **Standard Project** as the project type from the **Type** drop-down box.
3. Select the **Controller** as the device category from the **Category** drop-down box under **Select Device** settings.
4. Select the connected **Controller Model Series** as per requirement from the **Device** drop-down box. For this application note, **NJ301 Controller Series** is used.
5. Select the connected **Controller Model Number** as per requirement from the **Device** drop-down box. For this application note, **Model Number 1100** is used.
6. Select the connected **Controller Hardware Version** as per requirement from the **Version** drop-down box. For this application note, **Controller Version 1.18** is used.
7. Click on the **Create** button to create a new project.

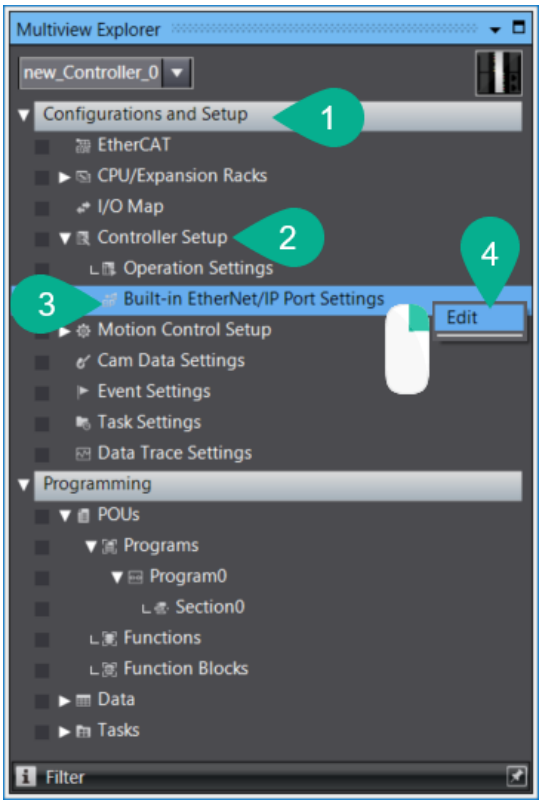
3.2 Controller Configuration and Setup

3.2.1 Built-in EtherNet/IP Port Settings

Note

- Skip this chapter if user when integrating into an existing project.

Step 1

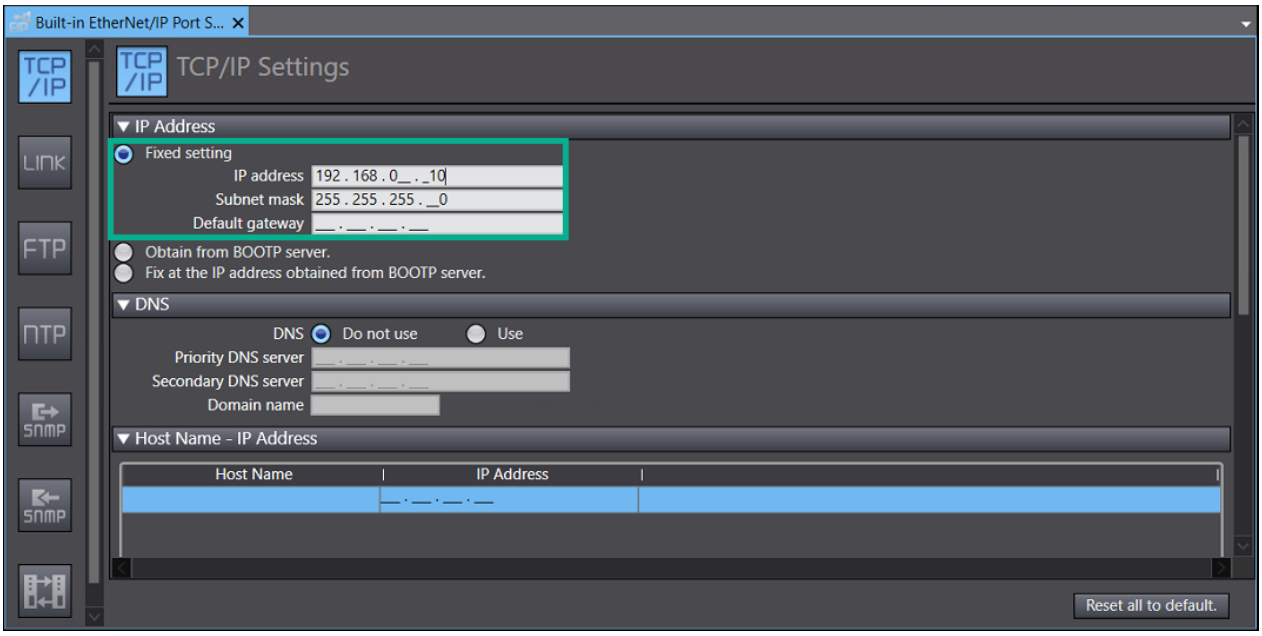


1. In the **Multiview Explorer** window, expand the **Configuration and Setup** option.
2. Expand the **Controller Setup** setting under **Configuration and Setup** option.
3. Select and right click on the **Built-in EtherNet/IP Port Settings** option from the **Controller Setup** settings.
4. Click on the **Edit** button to modify the **Built-in EtherNet/IP Port Settings** data.

Information

Users can also double click on the **Built-in EtherNet/IP Port Settings** to open the **Built-in EtherNet/IP Port Settings** window.

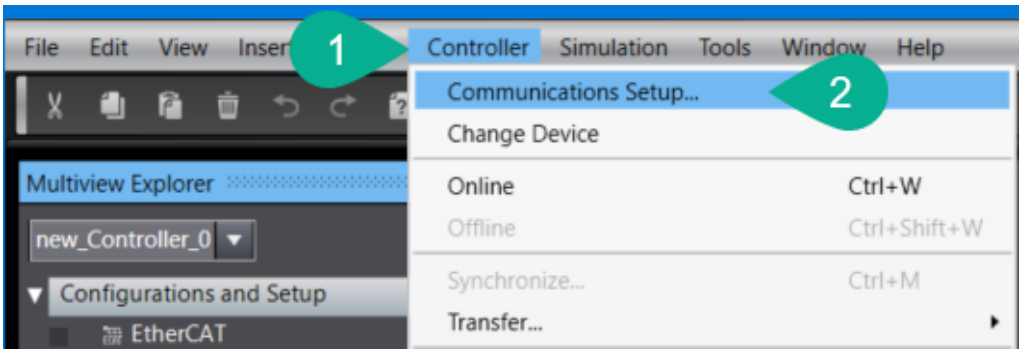
Step 2



In the **Built-in EtherNet/IP Port Settings** window, navigate to the **TCP/IP Settings** tab. Enter the required **IP Address** and **Subnet Mask** for **Ethernet Port** under the **Fixed Setting** option in the **IP Address** section.

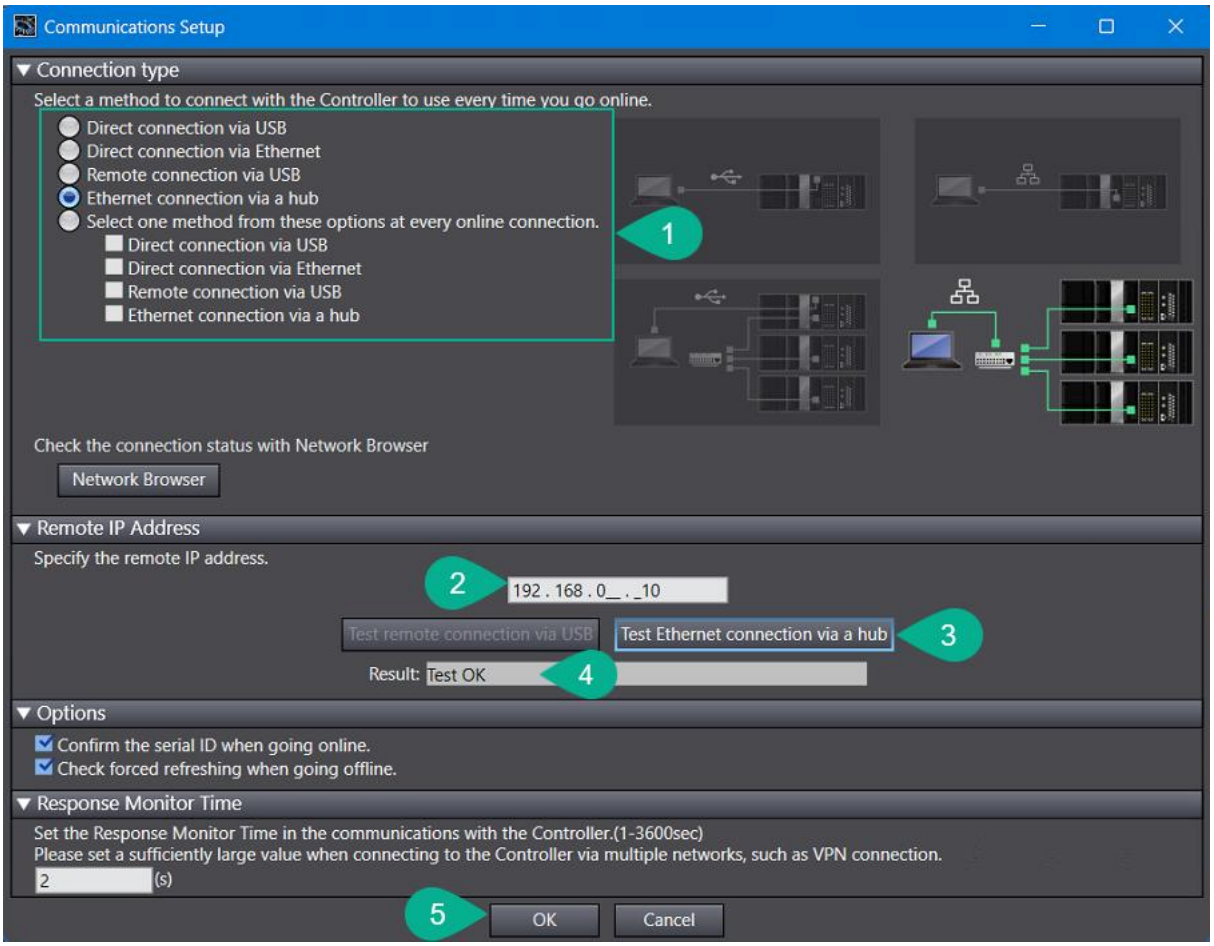
3.2.2 PLC Communication Setup

Step 1



1. Select the **Controller** menu option from the toolbar.
2. Click on the **Communications Setup...** option from **Controller** menu option to open the **Communications Setup** window.

Step 2



1. Select the type of **Connection Type** as per requirement from **Communications Setup** window. For this application note, **Ethernet connection via a hub** method used as **Connection Type** method.
2. Enter the **IP Address** of the controller in the **Remote IP Address** box.
3. Click on the **Test Ethernet Connection via a hub** button to assess the connection between PC and Controller.
4. Once connection established successfully, then the **Test OK** text will display in the **Result** box.
5. Click on the **OK** button to close the window.

➔ **Note**

The above step is only for when user using existing controller.

If user not using existing controller, then follow the points mentioned below.

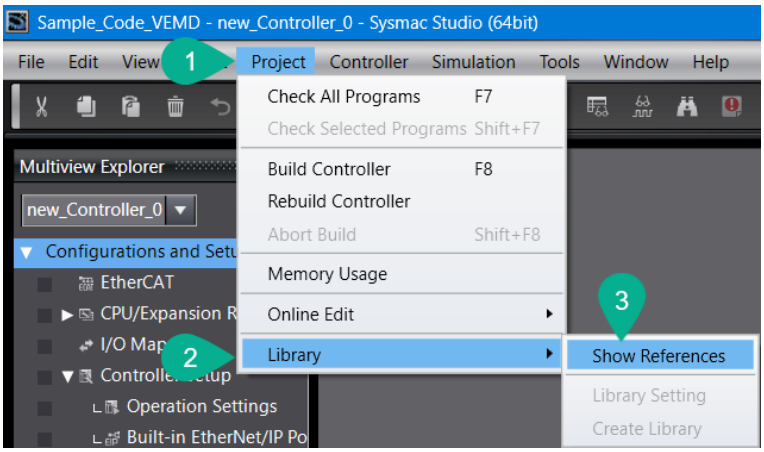
- The factory sealed controllers have default IP address. So, when using factory sealed controller or not knew IP Address of the controller use **Direct connection via USB** as connection type for first use.
- If some Omron PLCs does not support USB connection, then select **Direct connection via Ethernet** and use **default IP Address** for connection testing for factory sealed controller.
- Either case above mentioned, first download the program and then execute the above-mentioned step.

3.3 Adding Festo_VEMD_MB Library to Sysmac Project

Step 1

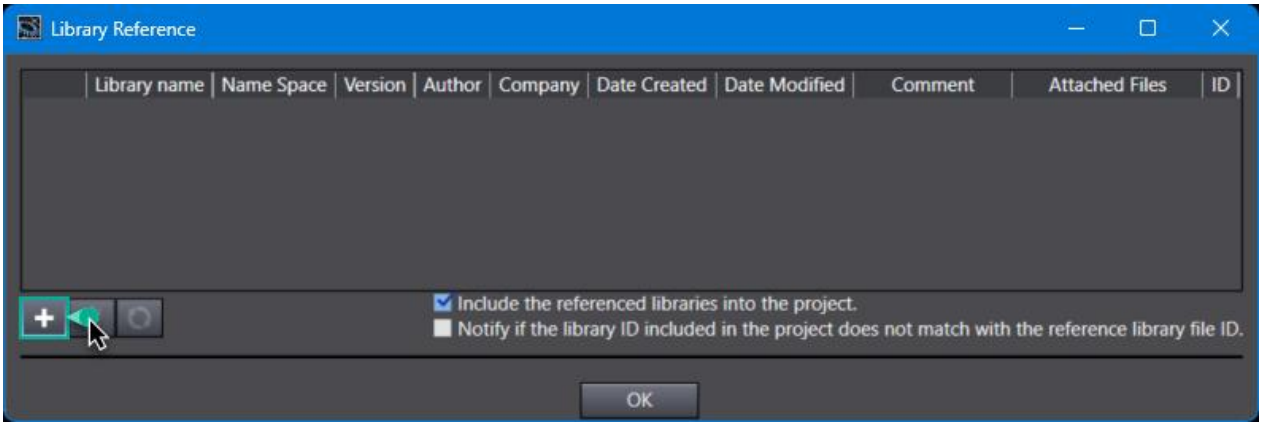
Download the **Festo_VEMD_MB** library from the **Festo Support Portal** and save it on appropriate folder on work-station.

Step 2



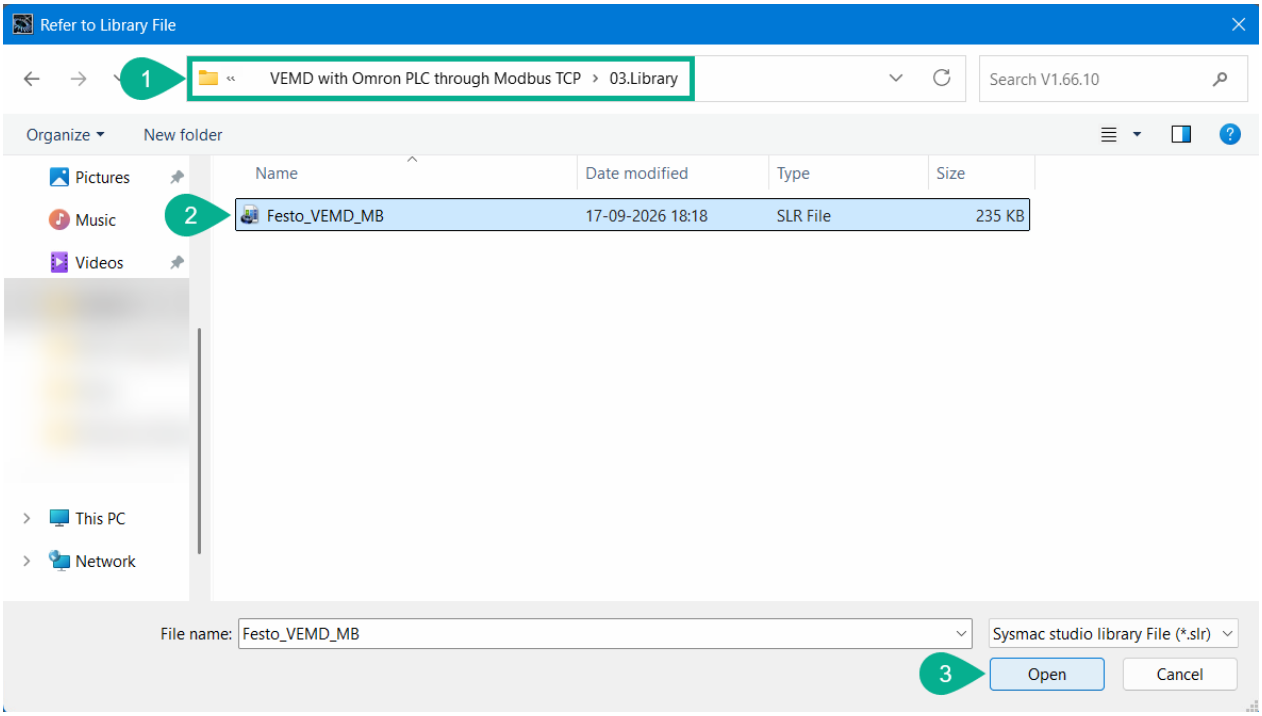
1. Select the **Project** menu option from the toolbar.
2. Select the **Library** option from the **Project** menu option.
3. Click on the **Show References** option from the list to open the **Library Reference** window.

Step 3



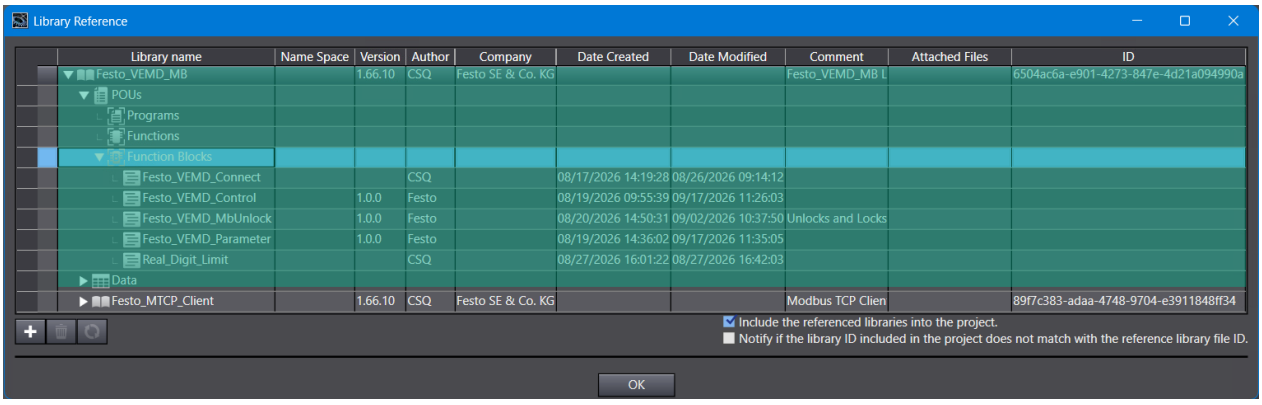
In the **Library Reference** window, click on the **Create Reference** button as shown to install a new library to Sysmac Project.

Step 4



1. Navigate to the destination folder where the library has been saved on workstation.
2. Select the **Festo_VEMD_MB** Sysmac Studio library file from the folder.
3. Click on the **Open** button to install the library.

Step 5



After the library is added successfully, its elements become available in the **Library Reference** window (highlighted in the green box), as shown above. Click on the **OK** button to close the **Library Reference** window.

The library has the following function blocks, structures, and enumerations.

Function Blocks:

- Festo_VEMD_Connect
- Festo_VEMD_Control
- Festo_VEM _Parameter

Supporting Function Blocks:

- Festo_VEMD_MBUnlock
- Real_Digit_Limit

Structure:

- MB_Client_Data

Union:

- Dword_to_Array

Enumerations:

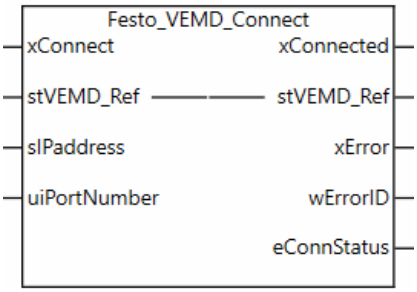
- Pressure_unit
- Flow_unit
- ErrorDescriptions
- Gas_Type
- Set_Point_Source
- Control_Type
- Analog_IO_Type
- ParameterStatus

The above-mentioned supporting function blocks, structures and enumerations are used in the VEMD library function blocks.

4 Festo_VEMD_MB_Library Function Blocks Description

4.1 Festo_VEMD_Connect

Festo_VEMD_Connect function block is responsible for establishing, maintaining, and closing a Modbus TCP connection between the controller and the VEMD device. This function block creates and manages exactly one physical socket connection per VEMD device. Once the connection is successfully established, Festo_VEMD_Connect exposes the resulting socket handle, along with essential connection parameters including the connection status through a shared reference structure.



4.1.1 Festo_VEMD_Connect In-Out Variables

In-Out Variable	Data Type	Description
stVEMD_Ref	STRUCT of the type **Festo_VEMD\MB_Client_Data**	Structure for VEMD Modbus Client Parameters. Refer Chapter 4.4.1.

Table 4.1: Festo_VEMD_Connect In-Out Variables description

4.1.2 Festo_VEMD_Connect Input Variables

Input Variable	Data Type	Description
xConnect	BOOL	**TRUE:** Establish a TCP connection **FALSE:** Close an established connection.
sIPaddress	STRING[16]	IP Address of Modbus TCP Slave.
uiPortNumber	UINT	Port Number of destination device.

Table 4.2: Festo_VEMD_Connect Input Variables descriptions

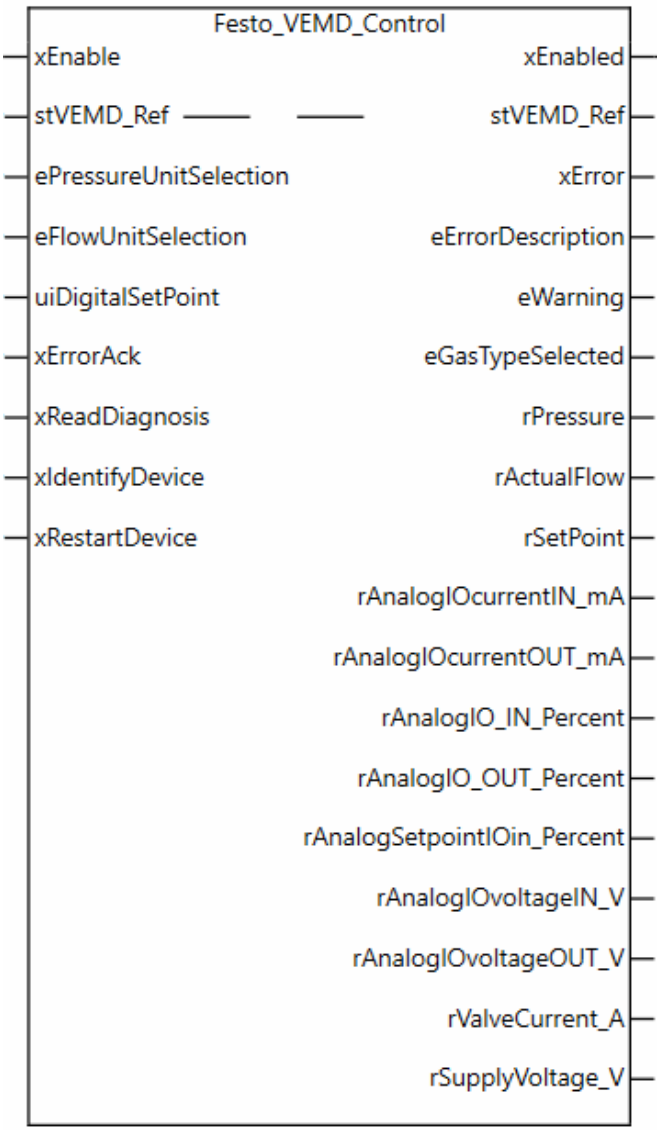
4.1.3 Festo_VEMD_Connect Output Variables

Output Variable	Data Type	Description
xConnected	BOOL	Active TCP connection status.
xError	BOOL	Error status bit.
wErrorID	WORD	Error ID.
eConnStatus	_eCONNECTION_STATE	TCP Handle status. This is a data type native to Omron Sysmac Studio software.

Table 4.3: Festo_VEMD_Connect Output Variables descriptions

4.2 Festo_VEMD_Control

Festo_VEMD_Control function block controls and monitors the VEMD device during normal operation. It takes inputs like enable, error acknowledge, unit selection, setpoint, diagnostics request, identify, and restart. It returns outputs such as busy, done, error, error description, gas type, pressure, flow, analog IO values, valve current, and supply voltage are updated cyclically.



4.2.1 Festo_VEMD_Control In-Out Variables

In-Out Variable	Data Type	Description
stVEMD_Ref	STRUCT of the type **Festo_VEMD\MB_Client_Data**	Structure for VEMD Modbus Client Parameters. Refer Chapter 4.4.1.

Table 4.4: Festo_VEMD_Control In-Out Variables description

4.2.2 Festo_VEMD_Control Input Variables

Input Variable	Data Type	Description
xEnable	BOOL	Enable Control Block.
ePressureUnitSelection	ENUM of the type **Festo_VEMD\Pressure_Unit**	Pressure Unit Selection Refer Chapter 4.5.1.
eFlowUnitSelection	ENUM of the type **Festo_VEMD\Flow_Unit**	Flow Unit Selection Refer Chapter 4.5.2.
uiDigitalSetPoint	UINT	Digital Setpoint (%FP 0– 10000).
xErrorAck	BOOL	Error Acknowledge.
xReadDiagnosis	BOOL	Read Diagnosis Data.
xIdentifyDevice	BOOL	Device Identification (Winks).
xRestartDevice	BOOL	Device Restarts.

Table 4.5: Festo_VEMD_Control Input Variables descriptions

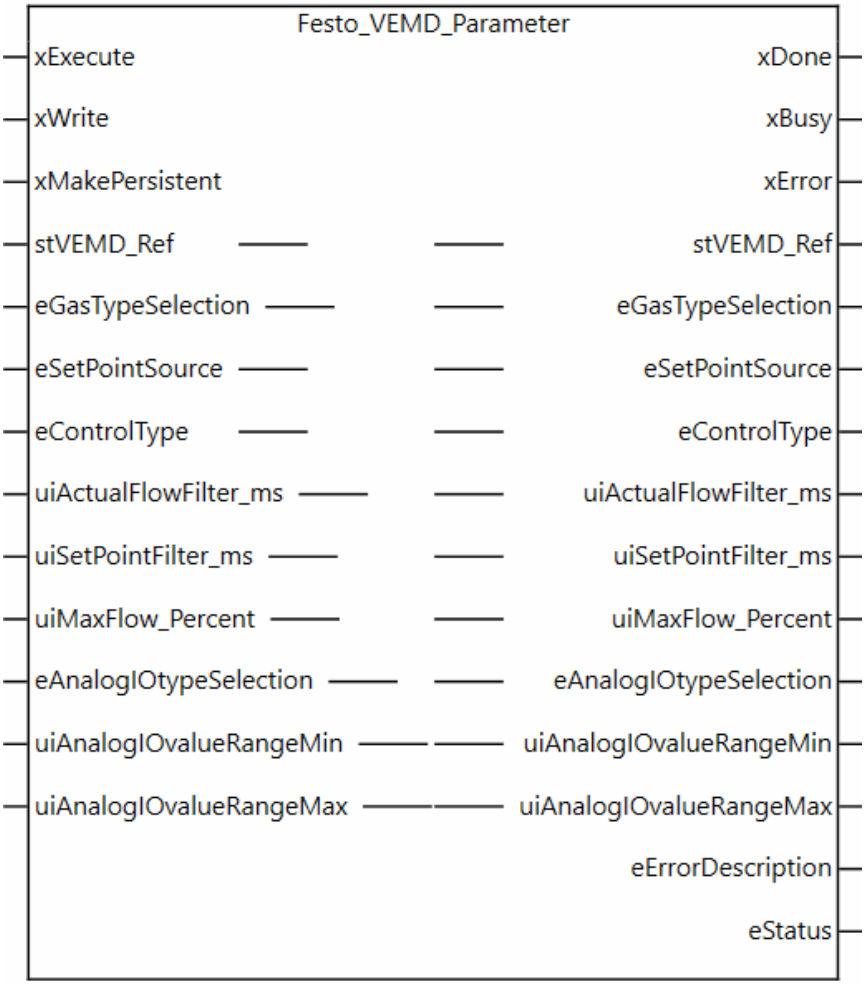
4.2.3 Festo_VEMD_Control Output Variables

Output Variables	Data Type	Description
xEnabled	BOOL	Block Enabled.
xError	BOOL	Error Status Bit.
eErrorDescription	ENUM of the type **Festo_VEMD\ErrorDescriptions**	Error Description Refer Chapter 4.5.3.
eWarning	ENUM of the type **Festo_VEMD\ErrorDescriptions**	Warning Description Refer Chapter 4.5.3.
eGasTypeSelected	ENUM of the type **Festo_VEMD\Gas_Type**	Gas Type Selected Refer Chapter 4.5.4.
rPressure	REAL	Supply pressure at the input in Supply pressure at the input in ePressureUnitSelection (bar / MPa / psi).
rActualFlow	REAL	Actual value of flow rate in unit selected by user at eFlowUnitSelection (g/min / % / ln/min / ls/min).
rSetPoint	REAL	Setpoint value of the flow rate for the closed-loop controller in unit selected by user at eFlowUnitSelection (g/min / % / ln/min / ls/min).
rAnalogIOcurrentIN_mA	REAL	Measured current in A filtered for the display at the analogue input. Only valid if type 4_20MA.
rAnalogIOcurrentOUT_mA	REAL	Measured current in A filtered for the display at the analogue output. Only valid if type 4_20MA.
rAnalogIO_IN_Percent	REAL	Analogue input value filtered for the display in % FS as a function of the entire analogue input range.
rAnalogIO_OUT_Percent	REAL	Analogue output value filtered for the display in % FS as a function of the entire analogue output range.
rAnalogSetpointIOin_Percent	REAL	Setpoint value of the flow rate of the analogue interface filtered for the display in % of the set analogue range.
rAnalogIOvoltageIN_V	REAL	Measured voltage in V filtered for the display at the analogue input. Only valid if type 0_10V or 1_5V.
rAnalogIOvoltageOUT_V	REAL	Measured voltage in V filtered for the display at the analogue output. Only valid if type 0_10V or 1_5V.
rValveCurrent_A	REAL	Valve current in A filtered for the display.
rSupplyVoltage_V	REAL	Supply voltage in V filtered for the display.

Table 4.6: Festo_VEMD_Control Output Variables descriptions

4.3 Festo_VEMD_Parameter

Festo_VEMD_Parameter function block handles reading and writing of configuration parameters on the VEMD device over the established Modbus TCP connection. It supports parameters such as gas type selection, setpoint source, control type, flow and setpoint filters, maximum flow limit, and analog IO type and range. Based on the selected operation, it either reads the current parameter values from the device or writes new values. It also supports permanently storing the configured parameters on the device. Outputs include busy, done, and error, along with a mapped error description, giving clear feedback on the progress and result of each parameter operation.



4.3.1 Festo_VEMD_Parameter In-Out Variables

In-Out Variables	Data Type	Description
stVEMD_Ref	STRUCT of the type **Festo_VEMD\MB_Client_Data**	Structure for VEMD Modbus Client Parameters. Refer Chapter 4.4.1.
eGasTypeSelection	ENUM of the type **Festo_VEMD\Gas_Type**	Medium used. Leads to an adjustment of the measured values to the set medium. Refer Chapter 4.5.4.
eSetPointSource	ENUM of the type **Festo_VEMD\Set_Point_Source**	Selection of the Set Point Source Refer Chapter 4.5.5.
eControlType	ENUM of the type **Festo_VEMD\Control_Type**	Controller mode used Refer Chapter 4.5.6.
uiActualFlowFilter_ms	UINT	Actual Flow Filter (ms) (0–65535).
uiSetPointFilter_ms	UINT	Set Point Filter (ms) (50–65535).
uiMaxFlow_Percent	UINT	Maximum Flow % (40–100).
eAnalogIOtypeSelection	ENUM of the type **Festo_VEMD\Analog_IO_Type**	Analog IO-Type Refer Chapter 4.5.7.
uiAnalogIOvalueRan-geMin	UINT	Analog IO Range Minimum % (0–100).
uiAnalogIOvalueRange-Max	UINT	Analog IO Range Maximum % (0–100).

Table 4.7: Festo_VEMD_Parameter In-Out Variables descriptions

4.3.2 Festo_VEMD_Parameter Input Variables

Input Variable	Data Type	Description
xExecute	BOOL	**TRUE** : Parameter Read Write Execute.
xWrite	BOOL	**FALSE** : Reads the parameters to device. **TRUE** : Writes the Parameters to device.
xMakePesristent	BOOL	**TRUE** : Stores Parameter permanently in Device.

Table 4.8: Festo_VEMD_Parameter Input Variables descriptions

4.3.3 Festo_VEMD_Parameter Output Variables

Output Variable	Data Type	Description
xDone	Bool	Parameter Read/ Write Complete.
xBusy	Bool	Parameter Read/ Write in Process.
xError	Bool	Error Status Bit.
eErrorDescription	ENUM of the type **Festo_VEMD\ErrorDescriptions**	Error Description Refer Chapter 4.5.3.
eStatus	ENUM of the type **Festo_VEMD\ParameterStatus**	Current Parameter Read / Write status display Refer Chapter 4.5.8.

Table 4.9: Festo_VEMD_Parameter Output Variables descriptions

4.4 Structure

4.4.1 MB_Client_Data

Structure Variables	Data Type	Description
byUnit_ID	BYTE	Unit Identifier.
xIpAddress_Empty	BOOL	IP address not entered in connect block's sIPaddress input tag.
xControlBlock_Active	BOOL	Control block active status.
xParameterBlock_Active	BOOL	Parameter block active status.
xConnected	BOOL	Modbus slave device connected status.
xConnect_Error	BOOL	Connect block error status bit.
wConnect_ErrorID	WORD	Connect block Error ID.
stSocket	_sSOCKET	Modbus TCP client socket. This is a data type native to Omron Sysmac Studio software.
eConnection_Status	_eCONNECTION_STATE	Connection Handle status. This is a data type native to Omron Sysmac Studio software.

Table 4.10: MB_Client_Data descriptions

4.5 Enumerations

4.5.1 Pressure_Unit

Enumeration Value	Enumeration Text
0	bar
1	MPa
2	psi

Table 4.11: Pressure_Unit enumeration

4.5.2 Flow_Unit

Enumeration Value	Enumeration Text
0	g_min
1	percentage
2	ln_min
3	ls_min

Table 4.12: Flow_Unit enumeration

4.5.3 ErrorDescriptions

Enumeration Value	Enumeration Text
0	No_Error
1	Illegal_Function
2	Illegal_Data_Address
3	Illegal_Data_Value
10	Communication_Timeout
11	Socket_not_connected
20	Control_Block_Active
50	Invalid_Digital_Setpoint
200	Pressure_of_Medium_Outside_the_allowable_Range
201	Valve_Current_Reduced_to_Prevent_Device_Overheating
205	Flow_Sensor_Cannot_Read
210	Incorrect_value
1024	Input_Value_Out_of_Range
1030	Illegal_Data_Position_Specified
1031	Data_Range_Exceeded
1049	Incorrect_Data_Type
8192	Local_IP_Address_Setting_Error
8193	Port_Already_in_Use
8194	Address_Resolution_Failed
8195	Socket_Status_Error
8196	Local_IP_Address_Not_Set
8197	Unable_to_use_BuiltIn_EtherNetIP_Port
8198	Socket_Timeout
8199	Socket_Handle_Out_of_Range
8200	Resource_OverFlow
8201	Destination_IP_Address_Not_Set
65535	Incomplete_Processing

Table 4.13: ErrorDescriptions enumeration

4.5.4 Gas_Type

Enumeration Value	Enumeration Text
0	Air
1	Ar
2	CO2
3	N2
4	O2
5	Nil

Table 4.14: Gas_Type enumeration

4.5.5 Set_Point_Source

Enumeration Value	Enumeration Text
0	Analog
1	Digital
2	Manual

Table 4.15: Set_Point_Source enumeration

4.5.6 Control_Type

Enumeration Value	Enumeration Text
0	Flow
1	Valve
2	Open
3	Close

Table 4.16: Control_Type enumeration

4.5.7 Analog_IO_Type

Enumeration Value	Enumeration Text
0	Zero_to_Ten_Volts
1	One_to_Five_Volts
2	Four_to_Twenty_mA

Table 4.17: Analog_IO_Type enumeration

4.5.8 ParameterStatus

Enumeration Value	Enumeration Text
0	Initialized
1	GasTypeSelection
2	SetPointSource
3	ControlType
4	ActualFlowFilter_ms
5	SetPointFilter_ms
6	MaxFlowPercent
7	AnalogIOtypeSelection
8	AnalogIOvalueRangeMin
9	AnalogIOvalueRangeMax
10	ReadComplete
11	WriteComplete
12	Parameter_is_Persistent
20	Modbus_Lock_unlock
21	No_Operation

Table 4.18: ParameterStatus enumeration

4.6 Union

4.6.1 Dword_To_Array

Union Variables	Data Type	Description
awDataWord	ARRAY[0..1] OF WORD	Array of word.
dwDataDword	DWORD	Dword.

Table 4.19: Dword_To_Array descriptions

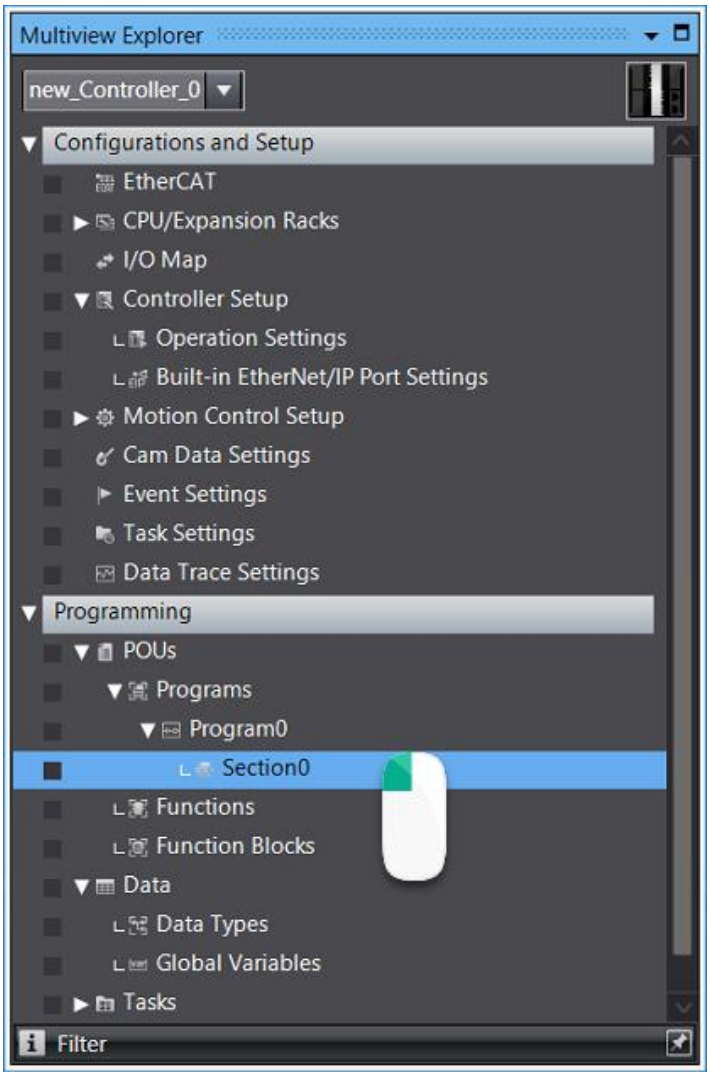
5 Configuration of VEMD Function Blocks in Omron Sysmac Studio Software

This chapter describes adding **Festo_VEMD_MB** library function blocks in program & assigning input, output tags.

Programming Language (Optional)

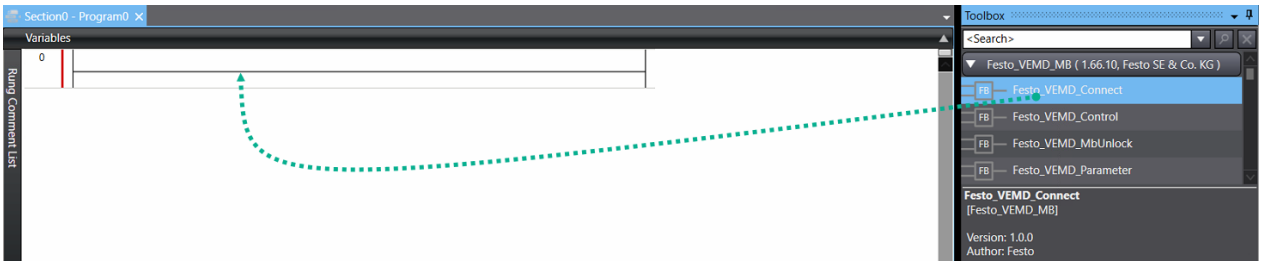
This application note explains integration of VEMD library function blocks in **Ladder Diagram (LD)** program.

Users can implement the function blocks as per their requirement.



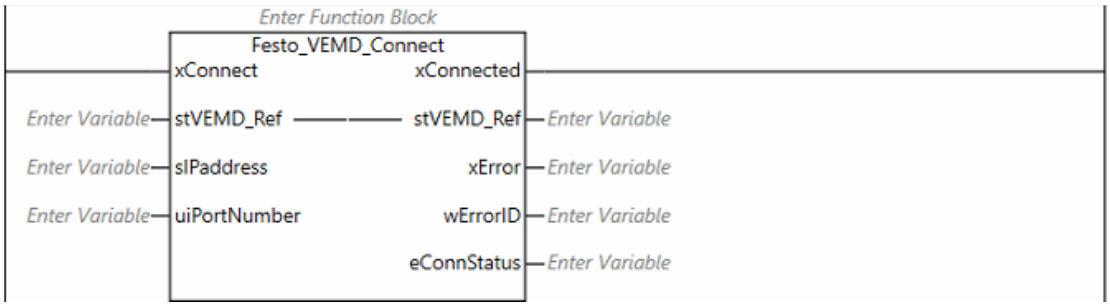
In the **Multiview Explorer** window, select and double-click on the **Section0** from **POUs >> Programs >> Program0** under the **Programming** option.

Step 1



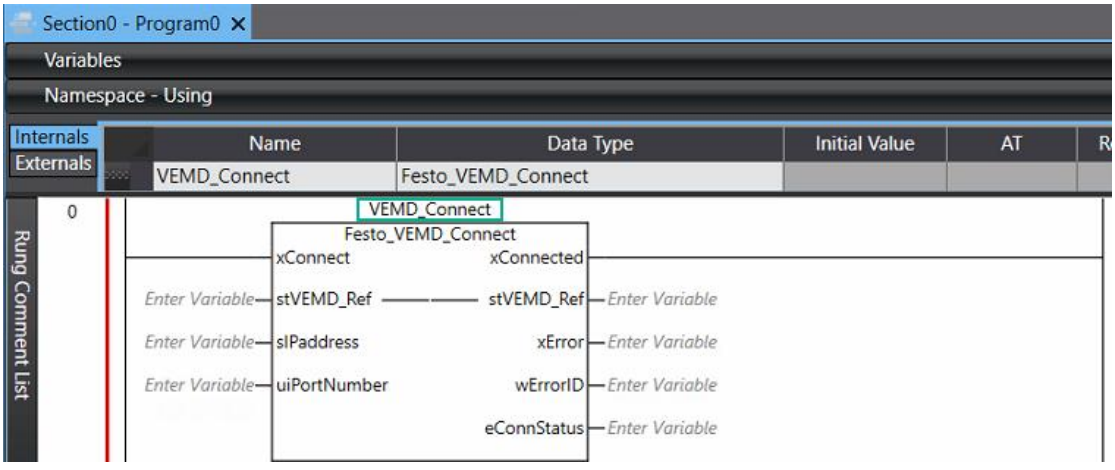
Drag and drop the **Festo_VEMD_Connect** function block under **Festo_ VEMD _MB (1.66.10, Festo SE & Co. KG)** folder from the **Toolbox** to the empty ladder rung on the **Edit Pane** as shown.

Step 2



Once the function block is inserted successfully then the view of the FB looks as shown.

Step 3

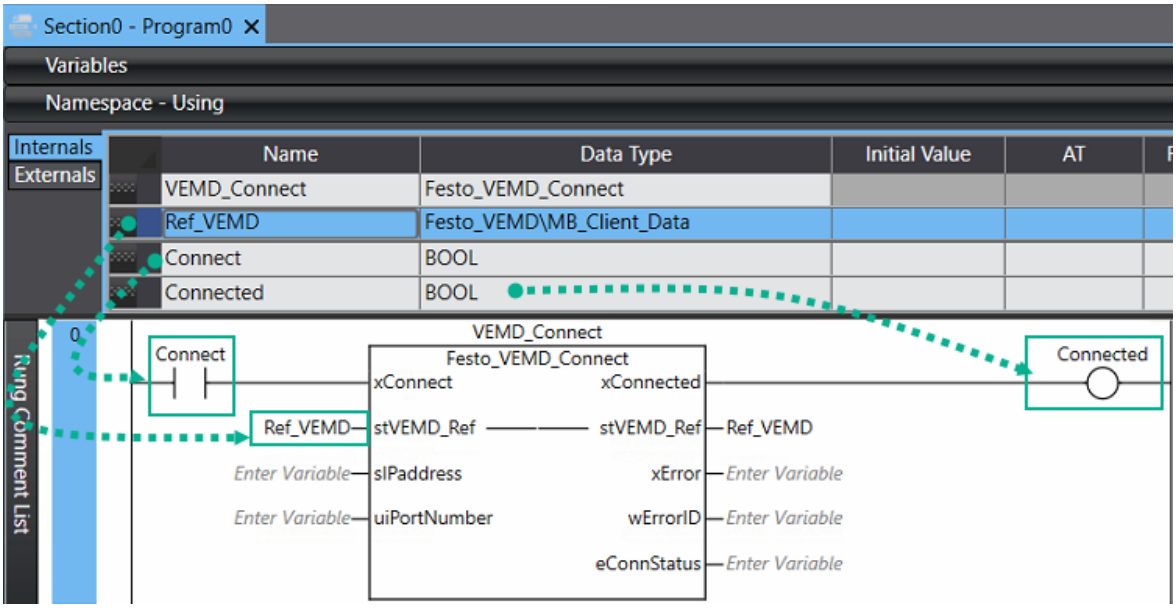


Enter the required name for the function block and click on the **Enter** button to create the function block instance as shown.

Variable Declaration Scope

Omron Sysmac Studio automatically assigns a data type to a variable created in the **Variables >> Internal** based on the function block's interface data types.

Step 4



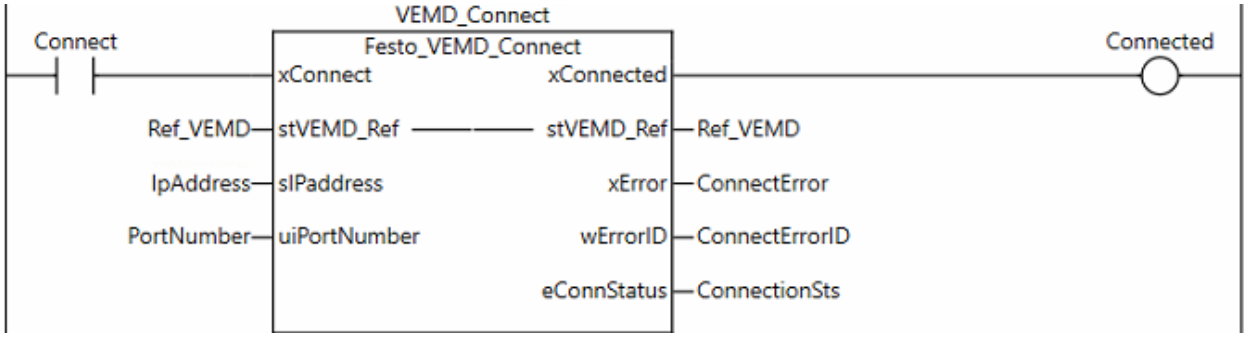
1. Create a tag with the required tag name for the FB interface tag **stVEMD_Ref,** and press Enter button to create a variable as shown.
2. Create a tag with the required tag name for the FB Interface tag **xConnect,** and press Enter button to create a variable as shown.
3. Create a tag with the required tag name for the FB Interface tag **xConnected,** and press Enter button to create a variable as shown.

Note

- Enter the same Variable used to create **stVEMD_Ref** in the **Festo_VEMD_Connect** for reference in all other function blocks in the **Festo_VEMD_MB** Library. For this application note **Ref_VEMD** is the variable used across all function blocks.

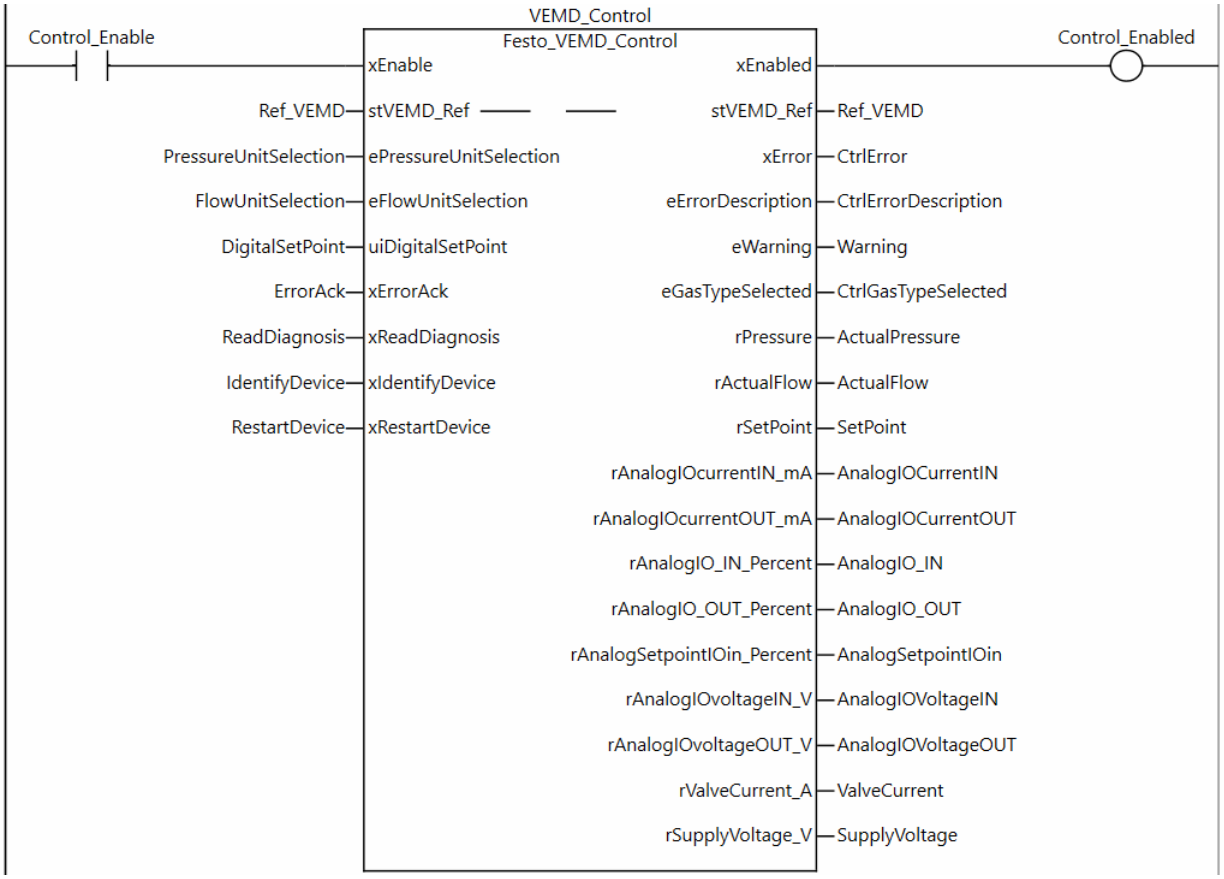
Repeat **Step 4** for the other interface tags of the function block.

Once all the IO assignments are complete, the **Festo_VEMD_Connect** block will appear as shown below.

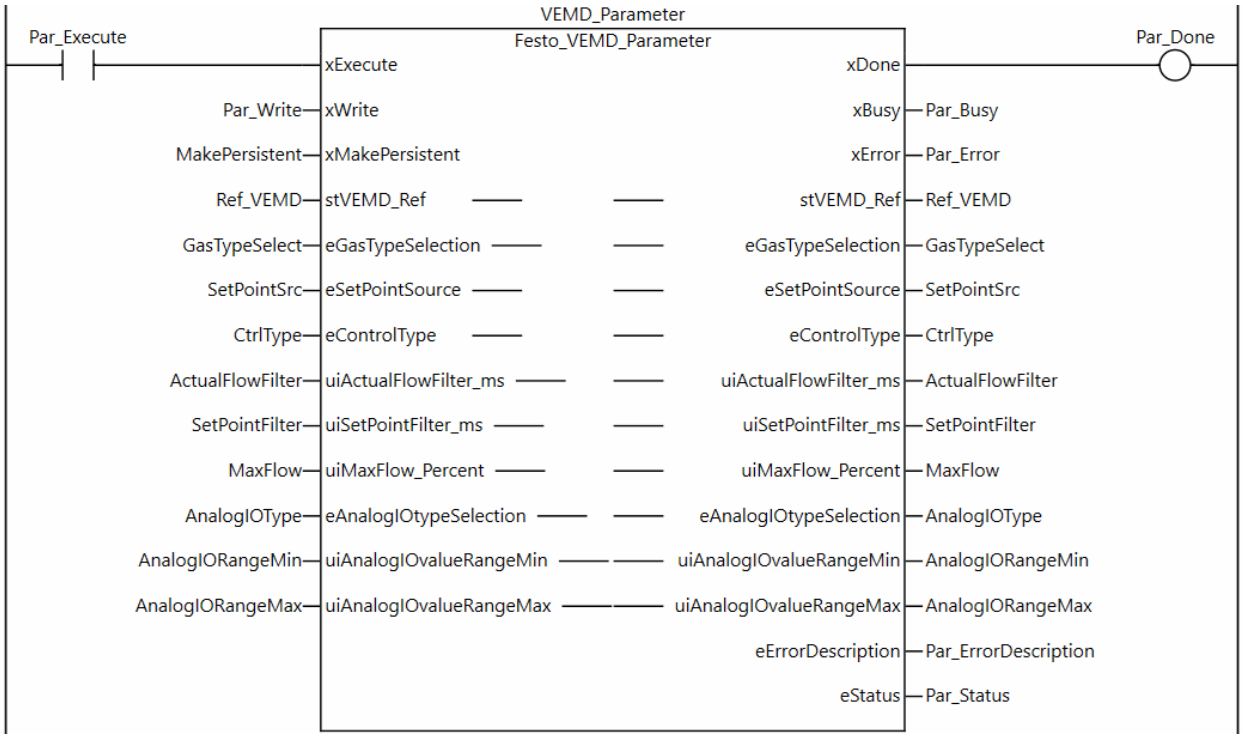


Refer from step 1 to step 4 and follow same procedure for configuring all the function blocks in the **Festo_VEMD_MB** library.

Once all the IO assignments are complete, the **Festo_VEMD_Control** block will appear as shown below.



Once all the IO assignments are complete, the **Festo_VEMD_Parameter** block will appear as shown below.

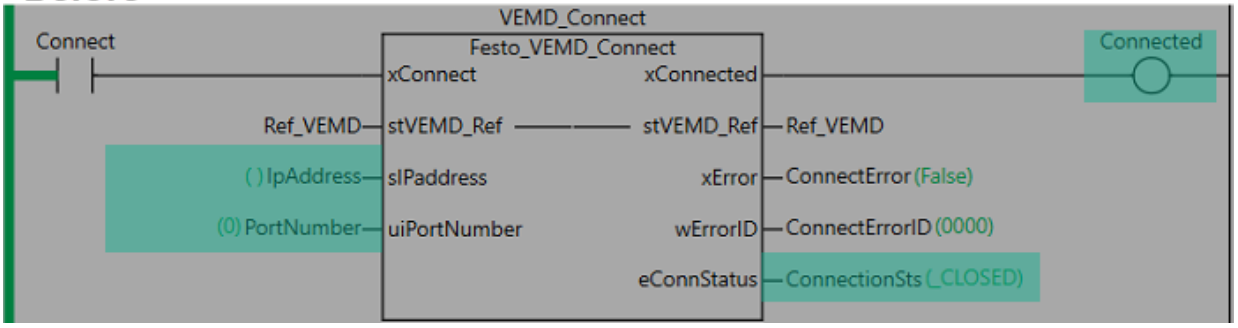


6 Sample Code for Festo_VEMD_MB Library Function Blocks

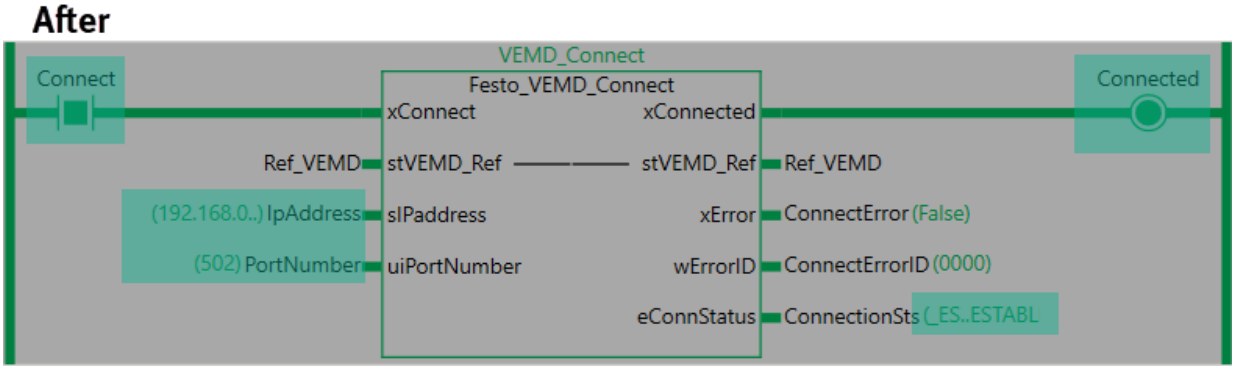
This chapter covers how to connect to the VEMD device, monitor its status, and control it during normal operation including setpoints, unit selection, diagnostics, error handling, and restart. It also shows how to read and write device parameters, and how to save those settings permanently on the device.

6.1 Festo_VEMD_Connect

Before



After



1. Enter the configured IP Address of the VEMD in **sIPaddress** Input. Refer Chapter 2.2.
2. Enter the Port Number as **502** default port number for Modbus TCP.
3. Turn on **xConnect** input for establishing connection with VEMD.
4. Once VEMD device connected, **eConnStatus** will appear as **ESTABLISHED** as shown. **xConnected** will be turned ON.

➔ **Note**

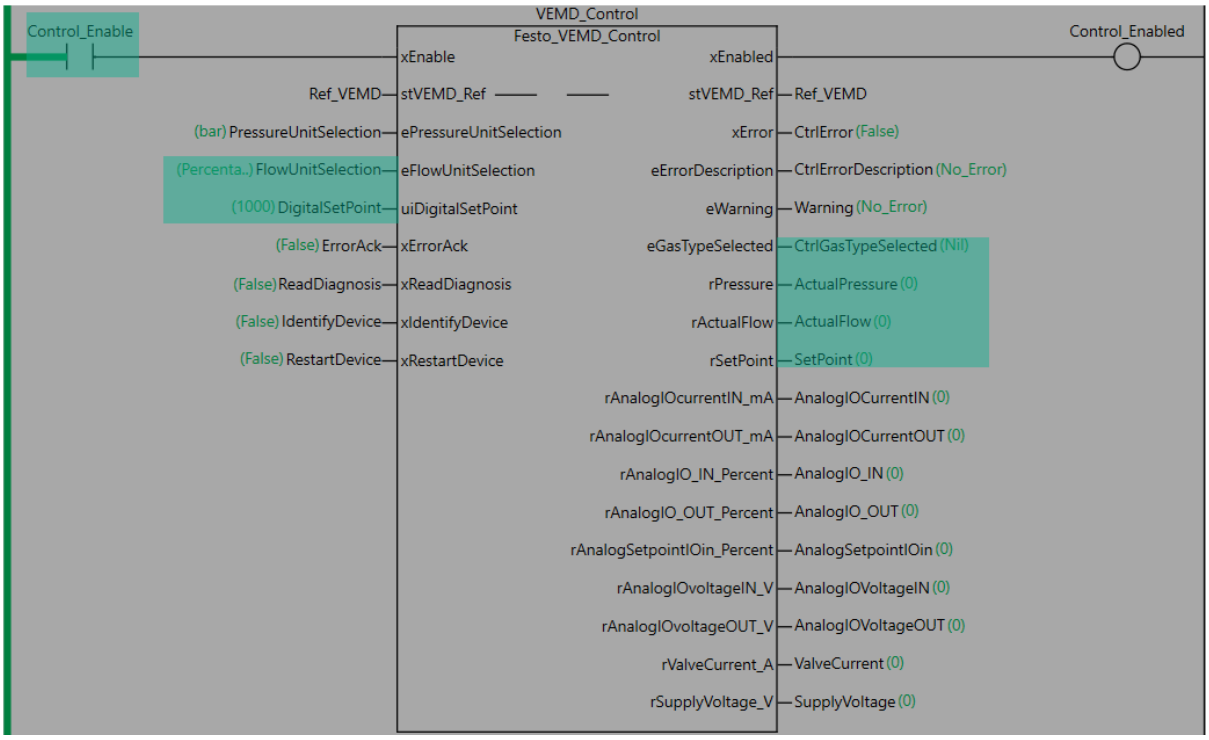
- User must ensure the proper IP address of the device.
- Internally default port number **502** is used for Modbus TCP connection. If user left port number as **0** still connection will be established.
- Connection establishment time is based on TCP/IP socket services based on controller.

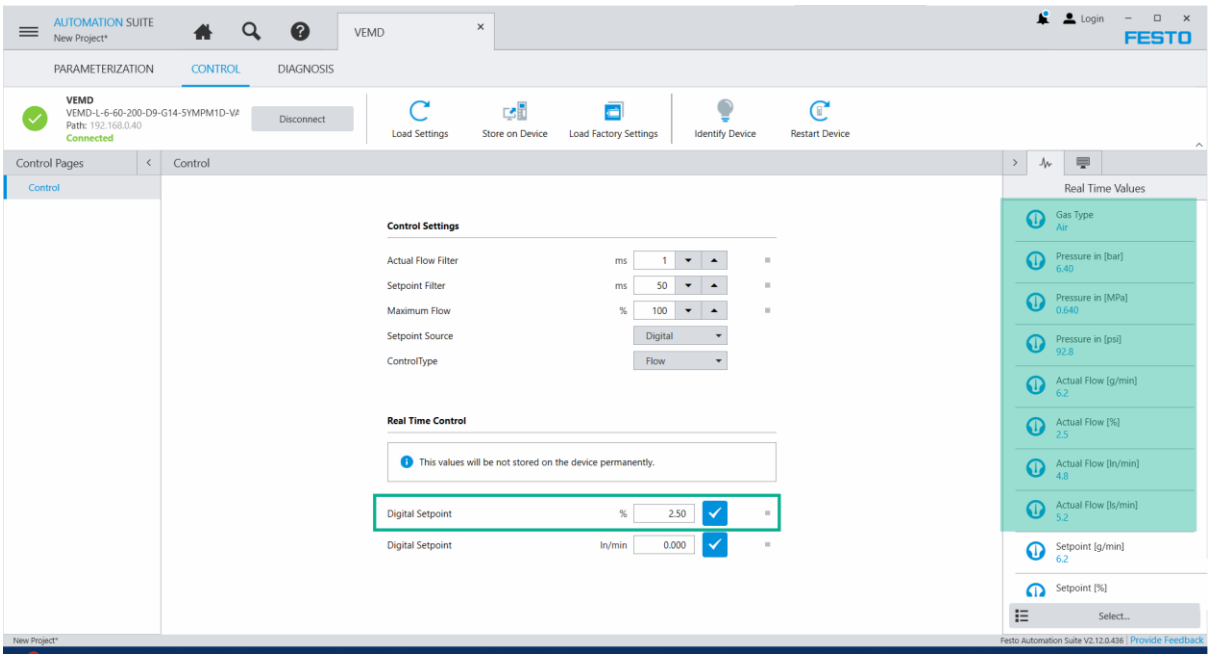
6.2 Festo_VEMD_Control

Example of configuring Digital Set point & Reading Diagnosis data

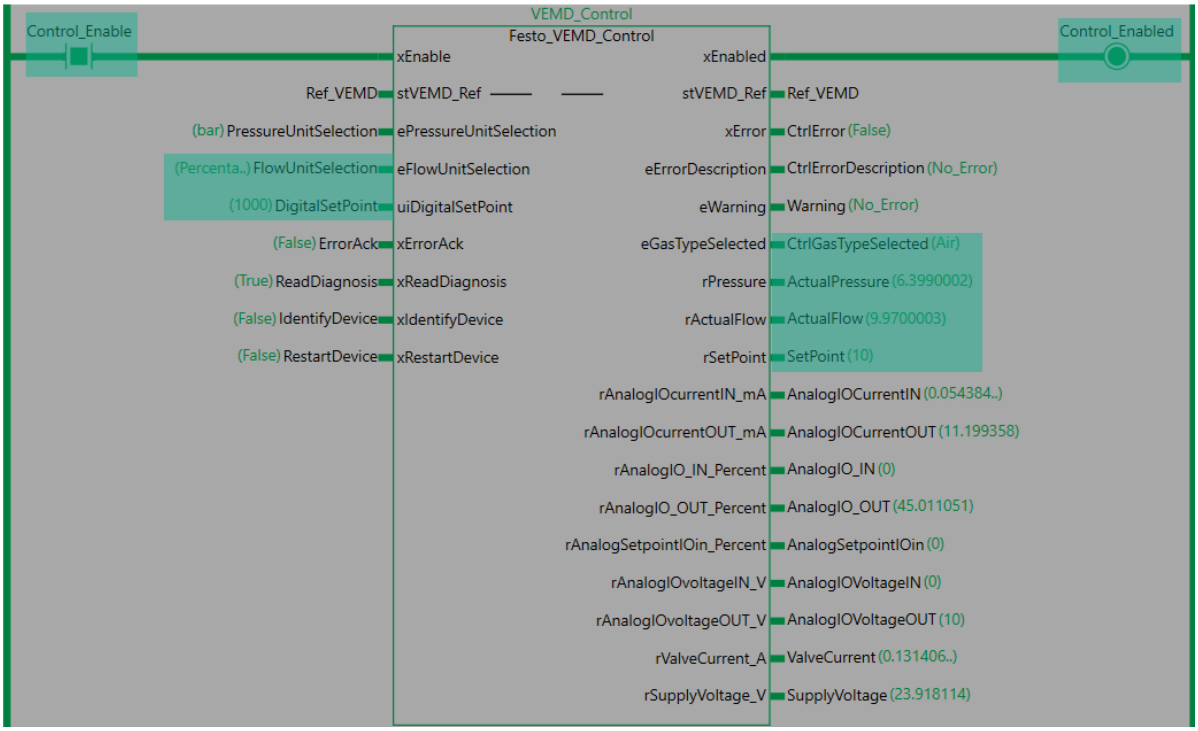
6.2.1 Digital Set point Configuration

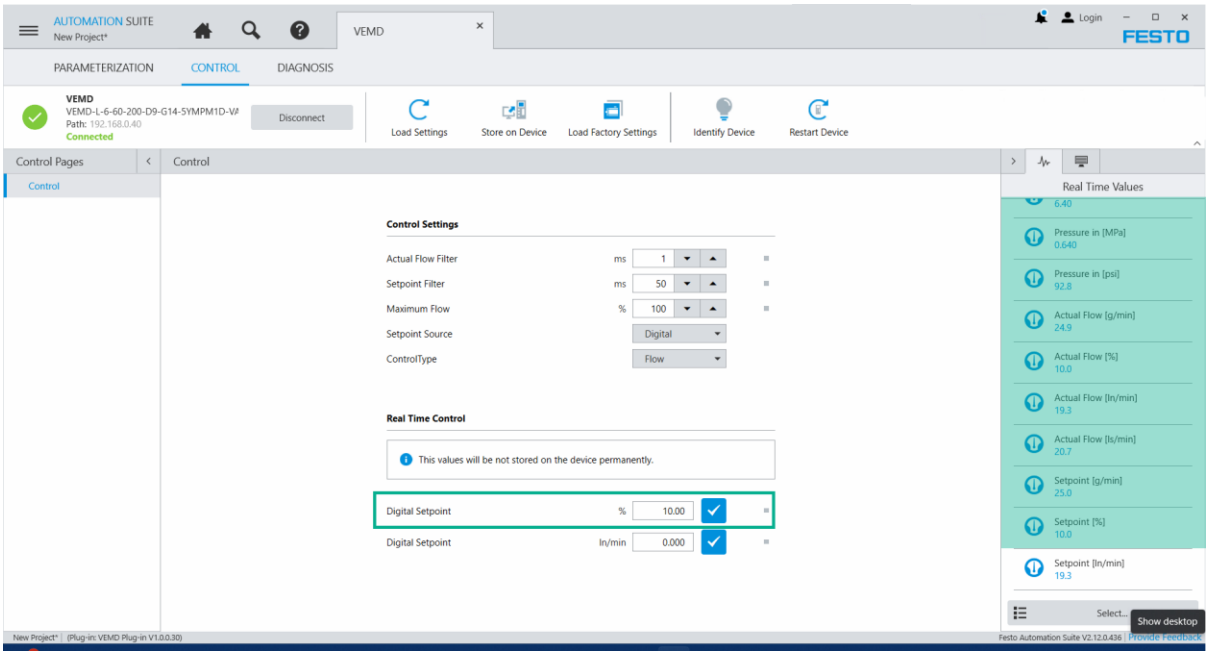
Before





After

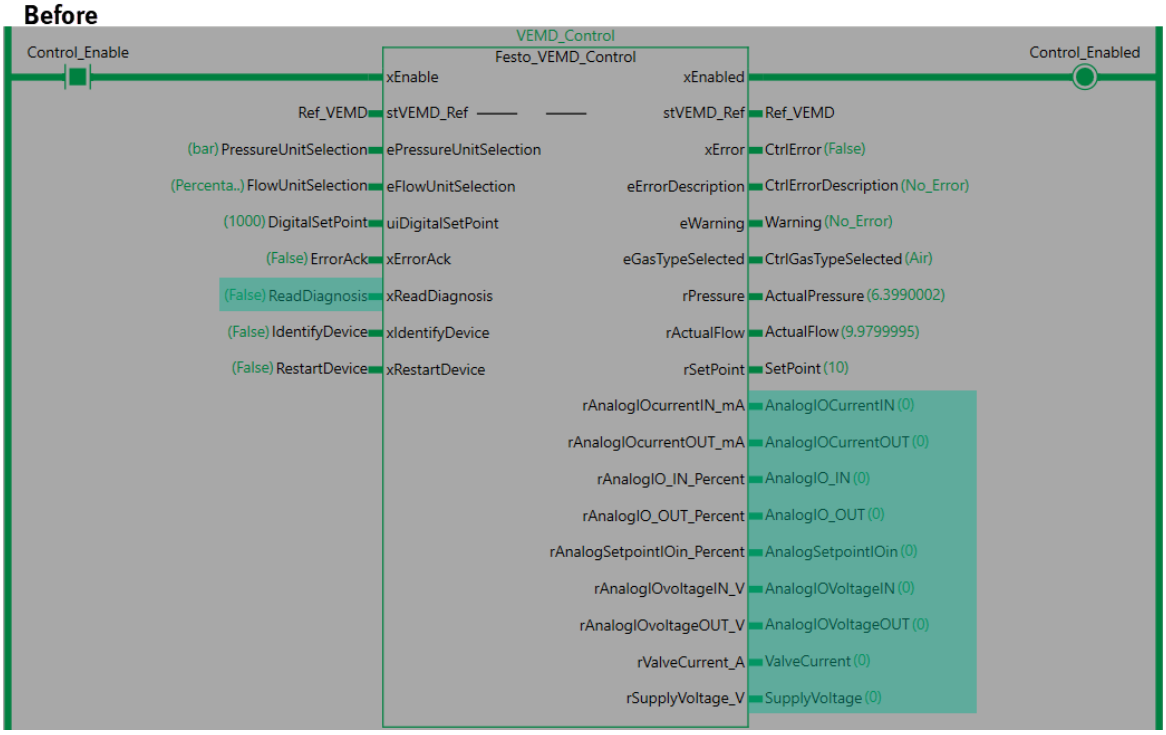




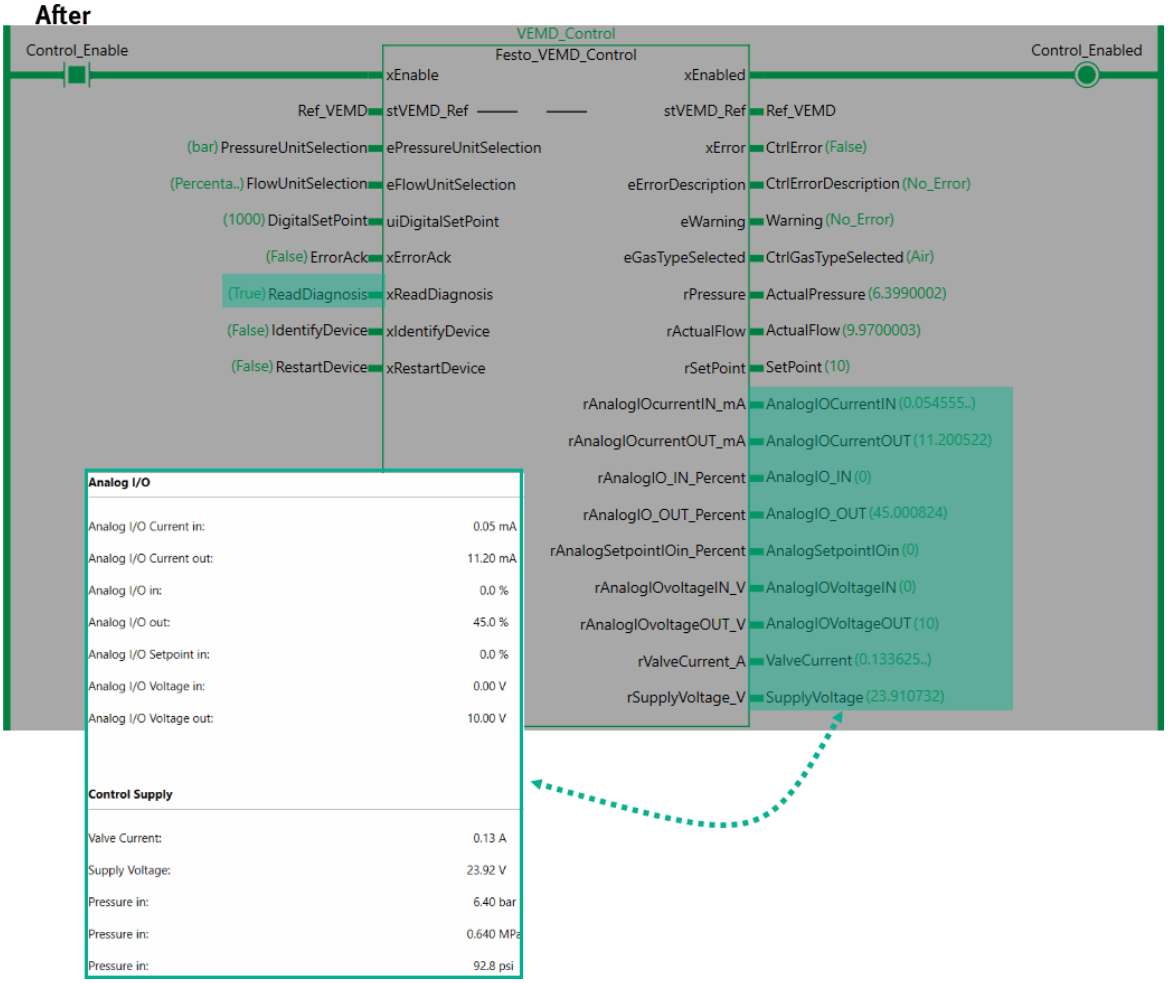
1. Set **Digital Setpoint** (0 -10000 i.e., 0 to 100.00%) in **uiDigitalSetPoint** as per requirement
2. Select **Pressure Unit Selection** (bar/ Mpa/ psi) in **ePressureUnitSelection** as per user preference
3. Select **Flow Unit Selection** (g_min / ln_min / ls_min / Percent) in **eFlowUnitSelection** as per user preference
4. Turn **xEnable** TRUE for controlling the digital flow setpoint and monitoring the actual values.
5. Once Enabled,Output **xEnabled** turns TRUE
6. **Gas type selected** will be updated in **eGasTypeSelected** as per actual medium.
7. **Actual Pressure** at input will be updated in **rPressure** w.r.t Pressure Unit Selection.
8. **Actual Flow** will be updated in **rActualFlow** w.r.t Flow Unit Selection.
9. **Setpoint** will be updated in **rSetpoint** (g/min / ln/min / ls/min / %), if Control Type is Open/ Valve.

6.2.2 Read Diagnosis

Before



After



1. Turn **xReadDiagnosis** to **TRUE** at Control block Enabled state.
2. Analog I/O Current in, Analog I/O Current out, Analog I/O in, Analog I/O out, Analog I/O Setpoint in, Analog I/O Voltage in, Analog I/O Voltage out, Valve Current, Supply Voltage will be updated in **rAnalogIOCurrentIN_mA, rAnalogIOCurrentOUT_mA, rAnalogIO_IN_Percent, rAnalogIO_OUT_Percent, rAnalogSetPointIOin_Percent, rAnalogIOvoltageIN_V, rAnalogIOvoltageOUT_V, rValveCurrent_A** and **rSupplyVoltage_V.**

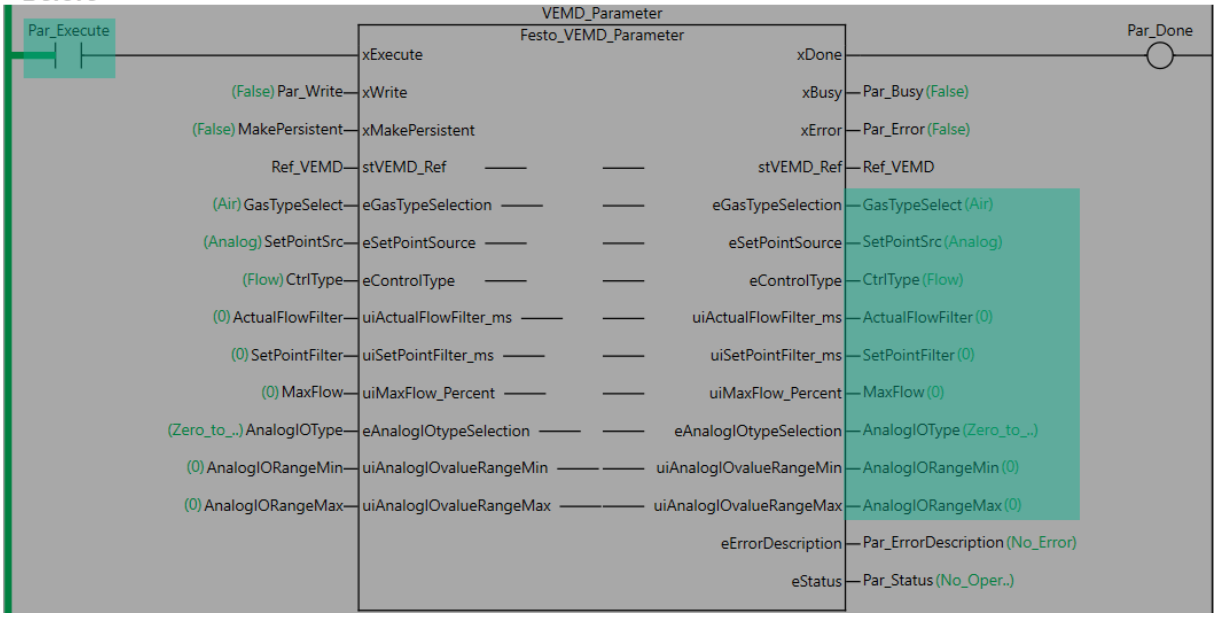
6.3 Festo_VEMD_Parameter

Note

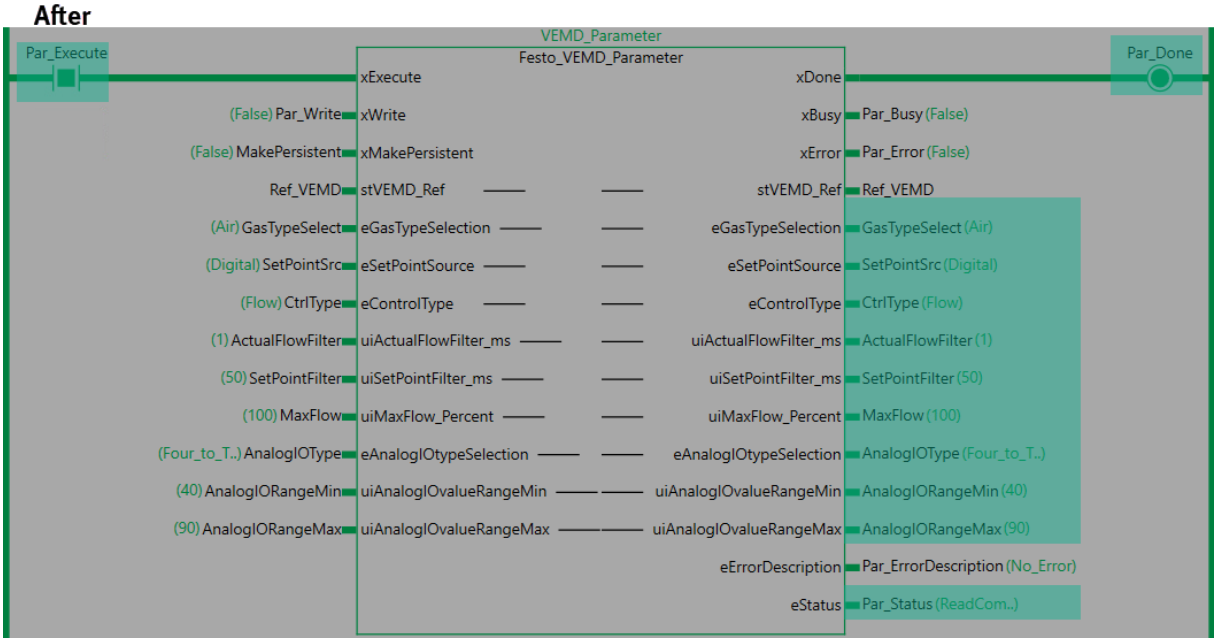
- User must ensure that **Festo_VEMD_Control** turned OFF before executing the Parameter Block

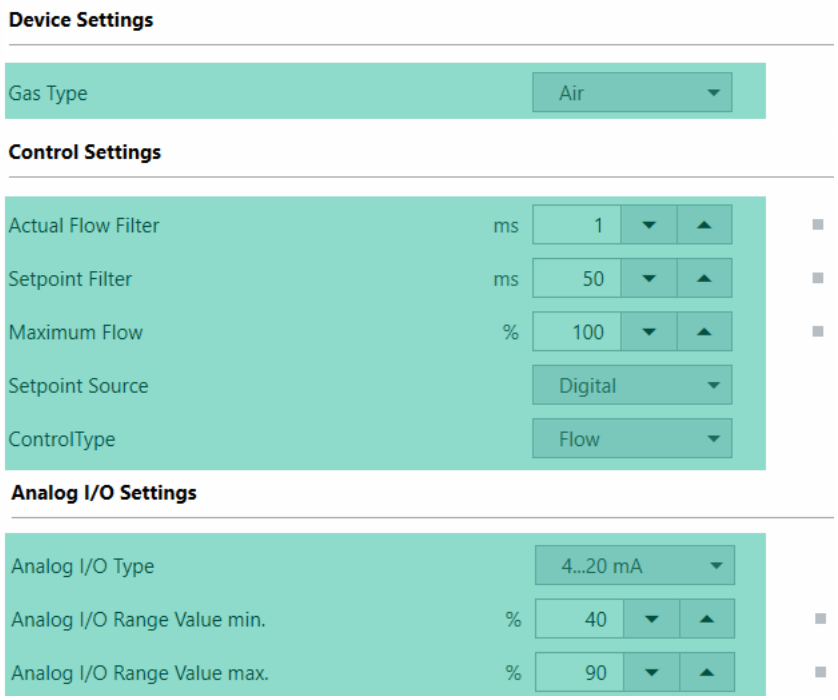
6.3.1 Parameter Read

Before



After

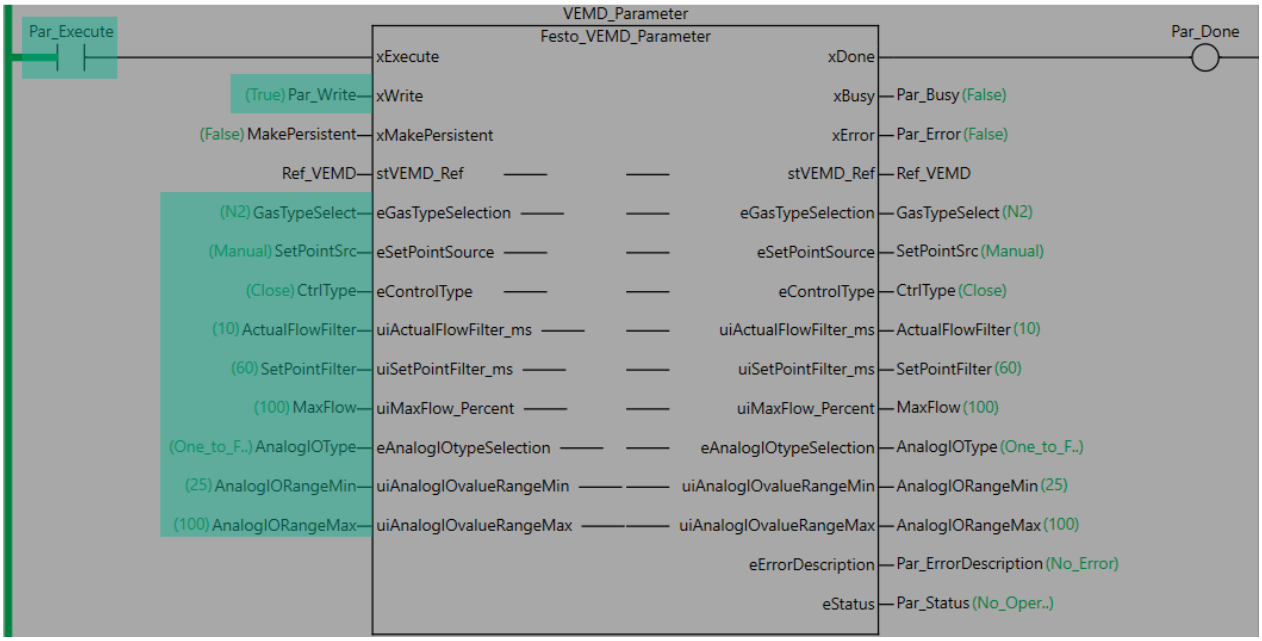




1. Ensure **xWrite** is set to **FALSE**
2. Enable **xExecute** to trigger read parameters.
3. **xBusy** turns TRUE while reading and turns FALSE once read completed
4. **eStatus** updates with respective Parameter names which are currently reading
5. **xDone** turns TRUE once reading Completed
6. **eStatus** will update with **ReadComplete** message
7. Gas Type Selection, Set Point Source, control type, Actual Flow filter, Maximum flow, Analog IO type Selection, Analog IO range Minimum, Analog IO range Maximum will be updated in **eGasTypeSelection, eSetPointSource, eControlType, uiActualFlowFilter_ms, uiSetPointFilter_ms, uiMaxFlow_Percent, eAnalogIOtypeSelection, uiAnalogIOvalueRangeMin, uiAnalogIOvalueRangeMax**.

6.3.2 Parameter Write

Before



Device Settings

Gas Type		Air

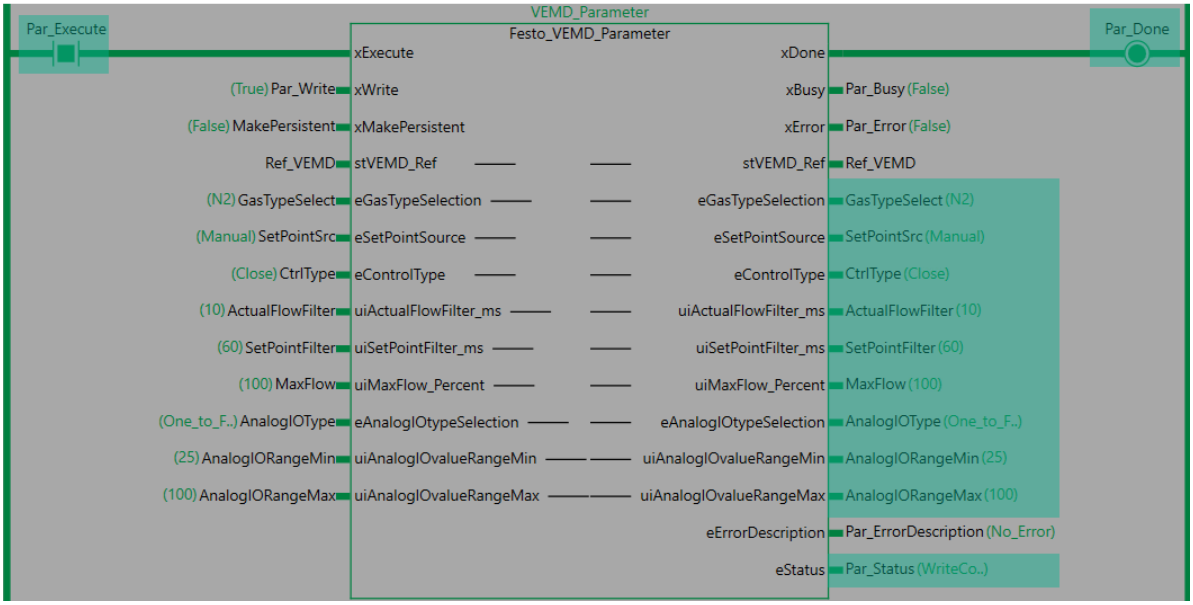
Control Settings

Actual Flow Filter	ms	1
Setpoint Filter	ms	50
Maximum Flow	%	100
Setpoint Source		Digital
ControlType		Flow

Analog I/O Settings

Analog I/O Type		4...20 mA
Analog I/O Range Value min.	%	40
Analog I/O Range Value max.	%	90

After



Device Settings

Gas Type		N2

Control Settings

Actual Flow Filter	ms	10
Setpoint Filter	ms	60
Maximum Flow	%	100
Setpoint Source		Manual
ControlType		Close

Analog I/O Settings

Analog I/O Type		1...5 V
Analog I/O Range Value min.	%	25
Analog I/O Range Value max.	%	100

1. Ensure **xWrite** is set to **TRUE.**
2. Set valid Values Gas Type Selection, Set Point Source, Control type, Actual Flow filter, Maximum flow, Analog IO type Selection, Analog IO range Minimum, Analog IO range Maximum in **eGasTypeSelection, eSetPointSource, eControlType, uiActualFlowFilter_ms, uiSetPointFilter_ms, uiMaxFlow_Percent, eAnalogIOtypeSelection, uiAnalogIOvalueRangeMin, uiAnalogIOvalueRangeMax** respectively
3. Enable **xExecute** to start writing the parameters.
4. **xBusy** turns TRUE while writing and turns FALSE once write completed.
5. **eStatus** updates with respective Parameter names which are currently writing.
6. **xDone** turns TRUE once writing Completed.
7. **eStatus** will update with **WriteComplete** message.