**SCADA\_DEV\_VLV**

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| **Version** | **Release Notes** |
| 4.0 | Enhancements open/close control and streamlining of differentiation between analog and discrete valves |

**Description**: This AOI is primarily intended to be used with analog or discrete valves. More generally, it can be used with any device that can be commanded to move to a fixed position.

**Naming Convention**: Tags using this UDT should be named using the first four fragments as defined in the tagging standard.

**UDT Members**

| **UDT Member** | **Datatype** | **Description** | **Usage** |
| --- | --- | --- | --- |
| ADDON | Valve\_v4 | Generator state evaluation AOI | Within the Device Program of the PLC |
| SCALE\_CV | SCALE\_FBD\_v2 | Output Scaling Block for Speed Command | Use in AO routine to scale engineering speed output to 4-20 mA signal |
| DI\_AA | BOOL | Plant Auto Mode | Used on HMI |
| DI\_PM | BOOL | Plant Manual Mode | Used on HMI |
| DI\_AD | BOOL | At least One Alarm Disabled | Used on HMI |
| DO\_OD | BOOL | Maintained Open Output | Used in DO\_Eval Routine if valve requires maintained signal to stay energized |
| DO\_SV | BOOL | Simulate Start Command | Map in DO\_Eval |
| DO\_ON | BOOL | Valve Open Command | Map in DO\_Eval to Output Card for valves with a pulsed open command |
| DO\_CE | BOOL | Valve Close Command | Map in DO\_Eval to Output Card for valves with pulsed closed wiring |
| DA\_SF | BOOL | Fail to Open Alarm | Used on HMI |
| DA\_XF | BOOL | Fail to Close Alarm | Used on HMI |
| DA\_SU | BOOL | Uncommanded Open Alarm | Used on HMI |
| DA\_XU | BOOL | Uncommanded Close Alarm | Used on HMI |
| PB\_SV | BOOL | Simulate Pushbutton | Map in DO\_Eval |
| PB\_PO | BOOL | Manual Mode Open Request | Used on HMI |
| PB\_PC | BOOL | Manual Mode Close Request | Used on HMI |
| PB\_AR | BOOL | Alarm Acknowledge/Reset | Used on HMI |
| PB\_PM | BOOL | Plant Manual Mode Request | Used on HMI |
| PB\_SM | BOOL | Alarm Simulate PB | Used on HMI |
| CV\_CT | REAL | Manual Position Setpoint | Used on HMI |
| AO\_CV | REAL | Output Setpoint | Used in AO Routine |
| DI\_CL | SCADA\_SYS\_DI\_1\_2 | Control Mode Input | Programmed in DI\_EVAL Routine |
| DI\_OD | SCADA\_SYS\_DI\_1\_2 | Open Feedback | Programmed in DI\_EVAL Routine |
| DI\_CD | SCADA\_SYS\_DI\_1\_2 | Closed Feedback | Programmed in DI\_EVAL Routine |
| DA\_GA | SCADA\_SYS\_DI\_1\_2 | General Alarm | Programmed in DI\_EVAL Routine |
| PB\_SF | PB\_EN\_RA\_DLR\_1\_2 | Fail to Open Enables | Used on HMI |
| PB\_XF | PB\_EN\_RA\_DLR\_1\_2 | Fail to Close Enables | Used on HMI |
| PB\_SU | PB\_EN\_RA\_DLR\_1\_2 | Uncommanded Open Enables | Used on HMI |
| PB\_XU | PB\_EN\_RA\_DLR\_1\_2 | Uncommanded Close Enables | Used on HMI |
| PB\_AE | PB\_EN\_RA\_DLR\_1\_2 | Virtual Alarm Enables | Used on HMI |

**AOI**

The AOI will be implemented within a valve routine in the Device Program.

| **AOI Parameter** | **Requirement** | **Default Value** | **Description** | **Implementation Guideline** |
| --- | --- | --- | --- | --- |
| Valve\_v4 | Mandatory | *Tagname.*ADDON | Motor AOI | N/A |
| Alarm\_Sim\_Enable | Mandatory | *Tagname*.PB\_SM | Alarm Simulate PB | N/A |
| Control\_Mode | Mandatory | *Tagname*.DI\_CL.eng | Control Mode Input Status | N/A |
| Closed\_Status | Mandatory | *Tagname*.DI\_CD.eng | Valve Closed Feedback | N/A |
| Open\_Status | Mandatory | *Tagname*.DI\_OD.eng | Valve Open Feedback | N/A |
| Station\_Control\_Power | Mandatory | *BXXPSB1CP1DA\_JR*.eng | Control Power status, masks alarms when power fails | Replace with a suitable power detection tag if control power failed status not available. |
| Manual\_Mode | Mandatory | *Tagname*.DI\_PM | Manual Mode Status | N/A |
| Auto\_Mode | Mandatory | *Tagname*.DI\_AA | Auto Mode Status | N/A |
| Manual\_Mode\_Request | Mandatory | *Tagname*.PB\_PM | Toggle Between Pant Auto and Plant Manual Mode | N/A |
| Manual\_Close\_Request | Mandatory | *Tagname*.PB\_PC | Manual Close Request from HMI | N/A |
| Manual\_Open\_Request | Mandatory | *Tagname*.PB\_PO | Manual Open Request from HMI | N/A |
| Auto\_Close\_Request | Optional | *Tagname*.ADDON.Auto\_Close\_Request | Plant Auto Close Request | Programmed outside AOI according to automatic control requirements |
| Auto\_Open\_Request | Optional | *Tagname*.ADDON.Auto\_Open\_Request | Plant Auto Open Request | Programmed outside AOI according to automatic control requirements |
| Valve\_Close\_Output | Mandatory | *Tagname*.DO\_CE | Valve Close Command | Map in DO\_Eval to Output Card for valves with pulsed open wiring |
| Valve\_Open\_Output | Mandatory | *Tagname*.DO\_ON | Valve Open Command | Map in DO\_Eval to Output Card for valves with pulsed closed wiring |
| Maintained\_Open\_Enable | Optional | *Tagname*.ADDON. Maintained\_Open\_Enable | Enable Maintained Open Output | Program outside AOI if valve requires a maintained signal to stay open |
| Maintained\_Open\_Output | Mandatory | *Tagname*.DO\_OD | Energize Valve Command | Map in DO\_Eval to Output card if valve requires a maintained signal to operate |
| Alarm\_Disabled | Mandatory | *Tagname.*DI\_AD | At least one alarm disabled | N/A |
| Alarms\_Enable | Mandatory | *Tagname.*PB\_AE | Global Alarm Enables | N/A |
| Fail\_To\_Open\_Enable | Mandatory | *Tagname.*PB\_SF | Fail to Start Enables | N/A |
| Fail\_To\_ Open \_Mask | Optional | *Tagname.*ADDON.Fail\_to\_Open\_Mask | Fail to Open Alarm Mask | Program external to the AOI with conditions that should inhibit the evaluation of the alarm logic |
| Fail\_To\_Open | Mandatory | *Tagname.*DA\_SF | Fail to Open Alarm | N/A |
| Fail\_To\_Close\_Enable | Mandatory | *Tagname.*PB\_XF | Fail to Close Enables | N/A |
| Fail\_To\_Close\_Mask | Optional | *Tagname.*ADDON.Fail\_to\_Close\_Mask | Fail to Close Alarm Mask | Program external to the AOI with conditions that should inhibit the evaluation of the alarm logic |
| Fail\_To\_Close | Mandatory | *Tagname.*DA\_XF | Fail to Close Alarm | N/A |
| Uncommanded\_Start\_Enable | Mandatory | *Tagname.*PB\_SF | Uncommanded Open Enables | N/A |
| Uncommanded\_Open\_Mask | Optional | *Tagname.*ADDON. Uncommanded \_Open\_Mask | Uncommanded Open Alarm Mask | Program external to the AOI with conditions that should inhibit the evaluation of the alarm logic |
| Uncommanded\_Open | Mandatory | *Tagname.*DA\_SF | Uncommanded Open Alarm | N/A |
| Uncommanded\_Close\_Enable | Mandatory | *Tagname.*PB\_XF | Uncommanded Close Enables | N/A |
| Uncommanded\_Close\_Mask | Optional | *Tagname.*ADDON. Uncommanded \_Close\_Mask | Uncommanded Close Alarm Mask | Program external to the AOI with conditions that should inhibit the evaluation of the alarm logic |
| Uncommanded\_Close | Mandatory | *Tagname.*DA\_XF | Uncommanded Close Alarm | N/A |
| Dialer\_Trigger | Optional | *Tagname.*ADDON.Dialer\_Trigger | Alarm Dialer Trigger | Use in a dialer routine to trigger callout of any alarms associated with the Motor |
| Interlock | Optional | *Tagname.*ADDON.Interlock | External Failure Operational Interlock | Program external to the AOI to inhibit operation based on state of hardwired alarms or other device tags |
| Failed\_Alarm\_Status | Optional | *Tagname.*ADDON.Failed\_Alarm\_Status | Indicates the presence of a virtual or hardwired device fault | Signal can be used as an interlock input to other devices or within ACP programming for failure handling |
| Auto\_Position\_Setpoint | Optional | *Tagname.*ADDON.Auto\_Position\_Setpoint | Automatic Position Setpoint | Programmed outside AOI according to automatic control requirements |
| Manual\_Position\_Setpoint | Mandatory | *Tagname.*SI\_CT | Manual Position Setpoint | N/A |
| Position\_Setpoint\_Min | Optional | *Tagname.*ADDON.Position \_Setpoint\_Min | Minimum allowable Operating Speed | Program outside of AOI to implement a minimum allowable position setpoint |
| Position\_Out\_Min | Optional | *Tagname.*ADDON. Position\_Out\_Min | 4 mA Position Value | Implement in conjunction with SCALE\_CV |
| Position\_Out\_Max | Optional | *Tagname.*ADDON. Position\_Out\_Min | 20 mA Position Value | Implement in conjunction with SCALE\_CV |
| Position\_Out | Mandatory | *Tagname.*AO\_CV | Position Command | Implement in conjunction with SCALE\_CV |
| Alarm\_Acknowledge | Mandatory | *Tagname*.PB\_AR | Alarm Acknowledge and Reset | N/A |
| Global\_Acknowledge | Optional | *Tagname*.ADDON.Global\_Acknowledge | Alarm Acknowledge and Reset | Reserved for Future Use with a Global Alarm Reset Pushbutton. To be programmed outside of the AOI. |

**AOI Operation Description**

The AOI performs the following functions:

* Executes alarm simulation logic
* Checks for disabled alarms.
* Executes Mode and open/closed Control Logic
* Executes Alarm Logic
* Performs Position Setpoint Evaluation Logic
* Perform check of alarm enable statues for indication of any disabled alarms
* Set the dialer bit for any configured alarms
* Setting of “last scan” values and reset of any pushbutton values

**Programming Examples**

This AOI may be used with the following types of devices:

* Discrete valves, with or without position feedback
* Analog valves, with or without position feedback

It is not necessary to hard code unused AOI parameters as the AOI can process the logic without any impact to other functions in use. As with other AOIs Dialer Alarm enables should be programmed to stay permanently disabled if they are not intended to trigger the dialer.

For analog valves with position feedback, the position Outputs are intended to be mapped into the Analog Input driver as the Scaled Setpoint Value for the purposes of evaluating the deviation alarm.

**HMI Integration**

This AOI is primarily intended for use with the following pop-ups:

* Valve Control v4\_0

HMI objects that reference an analog driver can be easily modified by selecting the object and performing a Substitute Tag operation to replace the placeholder tags with the correct device tagging. Template Objects that reference the AOI are stored on the “Symbols Library – Valves I” window in the InTouch Baseload. The list of available objects is not comprehensive and depending on the application some modifications may be required – e.g. body shape. The developer should contact the SCADA group and discuss requirements to ensure that the object is properly configured for use. It is recommended to make any necessary modifications to the Action Script, as detailed below, prior to performing the tag substitution to prevent any errors that may arise from attempting to substitute a tag that does not exist.

If the valve has position feedback an analog input driver will be required to generate all the necessary signals.

The following settings must be configured manually in the pop-up action script, if required:

If the valve is an analog valve the indirect tag mappings in the section of the Action script marked as “Mapping of tags applicable to discrete valves only. Set tagname to "" if not used” should be set to “”.

If the valve does not have analog setpoint control the indirect tag mappings in the section of the Action script marked as “Mapping of tags for analog valve setpoint. Set to "" if not used” should be set to “”.

If the valve does not have analog position feedback the indirect tag mappings in the section of the Action script marked as “Map Valve Position Feedback Tags” should be set to “”.

VLV\_VIS1 – Set to 1 if the valve has analog feedback, otherwise set to 0.

VLV\_VIS2 – Set to 1 if the valve has analog setpoint control, otherwise set to 0.

VLV\_VIS3 – Set to 1 if the valve has discrete control, otherwise set to 0.

VLV\_SRV – If the device is located on a remote InTouch Server, then this indirect tag must be changed to point at that server. By default it looks at the Hot Backup Pair Configuration for the local system.