Class Functional Specification

# Document Approval

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| Completion of the following signature blocks signifies the approver has reviewed this data and confirms all information is correct. | | | | | | | | | |
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|  |  | Name |  | Position |  | Signature |  | Date |  |

# Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Version** | **Changed by** | **Date** | **Change No.** | **Reason** |
| 1 | David Paspa | 13-11-2017 | NA | Initial Design |

# Index List

|  |  |
| --- | --- |
| **Class** | **Description** |
| DI1 | General alarm single digital input |
| DI2 | General alarm software module without field input |
| HE1 | Vessel vent filter Electric Heating Element |
| MI1 | Load cell mass indicator |
| MOD1 | Modulating control valve |
| MOT1 | Vacuum pump motor |
| PC1 | Vessel ON/OFF pressure control loop with output valve selection |
| PI1 | Vessel Pressure Indictor |
| POS1 | On/Off valve with single output and no feedback |
| POS2 | On/Off valve with single output and closed position feedback |
| POS3 | On/Off valve with single output and opened position feedback |
| POS4 | On/Off valve with single output and both opened and closed feedback |
| SIC1 | Agitator speed control |
| TC1 | Heat exchanger cooling only temperature controller |
| TI1 | Vessel temperature Indicator with alarms and interlocks |
| TI2 | Line mounted temperature indicator |
| VS1 | Vacuum system |
| ZSC1 | Manway closed indication and alarm |
| ZSC2 | Flow path connection indication |

|  |  |
| --- | --- |
| Class | Description |
| DI1 | General alarm single digital input |

# Scope

|  |
| --- |
| **Module Scope** |
| Applies to all digital input alarms throughout the Solution Manufacturing and Filling Systems. This CM is similar to the manway closed indication ZSC1 except this CM does not provide for alarm cutout and has different state names. |

# Functional Requirements

|  |  |
| --- | --- |
| **Req Ref** | **Requirement** |
| F1 | This CM shall indicate healthy if the digital input signal is ON. |
| F2 | This CM shall raise an interlock condition if the digital input signal is OFF. |
| F3 | This CM shall raise an alarm message if the digital input signal is OFF. |
| F4 | The signal from the field shall be fail-safe (i.e. always ON and any loop fault will generally cause the digital input to also go OFF). |
| F5 | This CM shall be used for the following types of field devices: |
| F6 | 1. Manufacturing and Storage Vessels Bursting Disc |
| F7 | 2. Plant Emergency Stop |
| F8 | 3. Instrument Air Pressure Switch |

# State Diagram

|  |
| --- |
|  |

# States

|  |  |  |  |
| --- | --- | --- | --- |
| **State** | **Alarm State** | **State Description** | **SFC** |
| ENABLED | No | Healthy state. Signal is ON. | None |
| ALARM | Yes | Alarm condition or loop has wiring fault. Signal is OFF. | None |

# Child Device Initial States

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Child Alias** | **Class** | **Description** | **Initial State** |
| None | DI | DI | Alarm input | None |

# Transitions

|  |  |
| --- | --- |
| **Transition** | **Description** |
| T1 | Recovery from ALARM state to healthy state when DI signal comes on. |
| T2 | DO signal goes off. |

# Parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Description** | **Min** | **Max** | **Default** | **Unit** |
| INTERLOCK | Interlock active flag set ACTIVE if DI = OFF. | 0 = INACTIVE | 1 = ACTIVE | 0.0 | @@UOM@@ |

# Alarms

|  |  |  |  |
| --- | --- | --- | --- |
| **Alarm** | **Condition** | **Priority** | **Message** |
| DIA | Digital input alarm | H | @@tag@@ fault |

# I/O (Physical I/O and ProfiNET I/O prefixed with a “P”)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mnemonic** | **Description** | **DI** | **DO** | **AI** | **AO** | **PDI** | **PDO** | **PAI** | **PAO** |
| DI | Alarm input | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |