*LIGO Laboratory / LIGO Scientific Collaboration*

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TwinCAT Library for
Shutter Control

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of the LIGO Laboratory.

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| **Library** |
| Title | ShutterControl |
| Version | 1 |
| TwinCAT version | 2.11 |
| Name space | – |
| Author | Alexa Staley, Daniel Sigg |
| Description | Controls the shutter controller |
| Error codes | 1 — Trigger |
| Library dependencies | Error, DCPower, ReadADC, WriteADC, SaveRestore |

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| **Shutter Controller Type**TYPE ShutterControlTypeEnum : (ShutterSimple, ShutterHardwareTrigger);END\_TYPE |
| Type name | ShutterControllerType |
| Description | Enumerates means used to trigger the shutter |
| Definition | ENUM |
| Element | Name: ShutterSimpleDescription: Simple Shutter |
| Element | Name: ShutterHardwareTriggerDescription: Shutter triggered by hardware |

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| **Shutter Controller State**TYPE ShutterControlStateEnum : (ShutterOpen, ShutterClosed;END\_TYPE |
| Type name | ShutterControlType |
| Description | Enumerates the state of the shutter controllers |
| Definition | ENUM |
| Element | Name: ShutterOpenDescription: Shutter is open |
| Element | Name: ShutterClosedDescription: Shutter is closed |

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| **Hardware Input Type**TYPE ShutterControlInStruct :STRUCTState: BOOL; Trigger: INT;END\_STRUCTEND\_TYPE |
| Type name | ShutterControlInStruct |
| Description | Structure of the hardware input that are wired up for the shutter control |
| Definition | STRUCT |
| Element | Name: StateType: BOOLDescription: Binary inputs for shutter monitor |

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| **Hardware Output Type**TYPE ShutterControlOutStruct :STRUCT Close: BOOL;Open: BOOL; Threshold: INT;END\_STRUCTEND\_TYPE |
| Type name | ShutterControlOutStruct |
| Description | Structure of the hardware output that are wired up for the shutter control |
| Definition | STRUCT |
| Element | Name: CloseType: BOOLDescription: Close shutter |
| Element | Name: OpenType: BOOLDescription: Open shutter |
| Element | Name: ThresholdType: INTDescription: Threshold to open/close shutter |

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| **User Interface Type**TYPE ShutterControlStruct :STRUCTError: ErrorStruct;Name: STRING (40);ControllerType: ShutterControlTypeEnum;State: ShutterControlStateEnum;Open: BOOL;Close: BOOL;Threshold: LREAL;Trigger: DCPowerStruct;END\_STRUCTEND\_TYPE |
| Type name | ShutterControlStruct |
| Description | Structure of the user interface tags that are used to control the shutter control |
| Definition | STRUCT |
| Output Tag | Name: ErrorType: ErrorStructDescription: For error handling |
| Output Tag | Name: NameType: STRINGDescription: Location of the shutter |
| Input Tag | Name: ControllerTypeType: ShutterControlTypeEnumDescription: Type of shutter |
| Input Tag | Name: StateType: ShutterControlStateEnumDescription: State of the shutter |
| Input Tag | Name: CloseType: BOOLDescription: Close shutter when true |
| Input Tag | Name: OpenType: BOOLDescription: Open shutter when true |
| Input Tag | Name: ThresholdType: LREALDescription: Threshold voltage for trigger PD |
| Output Tag | Name: TriggerType: DCPowerStruct;Description: Trigger from PD |

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| **Function Block**FUNCTION\_BLOCK ShutterControlFBVAR\_INPUT Request: SaveRestoreEnum; ShutterControlType: ShutterControlTypeEnum := ShutterSimple;ShutterControlIn: ShutterControlInStruct;END\_VARVAR\_OUTPUTShutterControlOut: ShutterControlOutStruct;END\_VARVAREND\_VARVAR\_IN\_OUT ShutterControlInit: ShutterControlStruct; ShutterControl: ShutterControlStruct;END\_VAR |
| Name | ShutterControlFB |
| Description | Controls the shutter control  |
| Input argument | Name: RequestType: SaveRestoreEnumDescription: Request save/restore/safemode or noop |
| Input argument | Name: ShutterControlTypeType: ShutterControlTypeEnumDescription: Set shutter controller type |
| Input argument | Name: ShutterControlInType: ShutterControlInStructDescription: Input hardware structure |
| Output argument | Name: ShutterControlOutType: ShutterControlOutStructDescription: Output hardware structure |
| In/out argument | Name: ShutterControlInitType: ShutterControlStructDescription: Save/restore variable in persistent memory |
| In/out argument | Name: ShutterControlType: ShutterControlStructDescription: User Interface structure |

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| **Visual** |
| Name | ShutterControlVis |
| Description | Displays open and close buttons for the shutter and the shutter monitor |
| Placeholder | Name: ShutterControlType: ShutterControlStructDescription: Shutter Control structure |