*LIGO Laboratory / LIGO Scientific Collaboration*

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TwinCAT Library for
Fast Shutter Control

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of the LIGO Laboratory.

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| **Library** |
| Title | FastShutterControl |
| Version | 1 |
| TwinCAT version | 2.11 |
| Name space | – |
| Author | Daniel Sigg |
| Description | Controls the fast shutter controllerSee also [T1400687](https://dcc.ligo.org/LIGO-T1400687). |
| Error codes | 1 — Fault (fault in driver circuit)2 — Not ready (shutter HV capacitors are not charged)4 — Not open (unblock requested, but shutter is closed)8 — Not closed (block requested, but shutter open) |
| Library dependencies | ShutterControl, Error, DCPower, ReadADC, WriteADC, SaveRestore |

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| **Shutter Controller Mode**TYPE ShutterControlModeEnum : (ShutterUnblock, ShutterBlock);END\_TYPE |
| Type name | ShutterControllerModeEnum |
| Description | Enumerates over shutter modes |
| Definition | ENUM |
| Element | Name: ShutterUnblockDescription: Unblock the fast shutter |
| Element | Name: ShutterBlockDescription: Block the fast shutter |

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| **Hardware Input Type**TYPE FastShutterControlInStruct :STRUCTHvReadyMon: BOOL;StatusMon: BOOL;FaultMon: BOOL; END\_STRUCTEND\_TYPE |
| Type name | FastShutterControlInStruct |
| Description | Structure of the hardware input that are wired up for the fast shutter control |
| Definition | STRUCT |
| Element | Name: HvReadyMonType: BOOLDescription: Binary input for fast shutter HV readiness |
| Element | Name: StatusMonType: BOOLDescription: Binary input for fast shutter state (close/open) |
| Element | Name: FaultMonType: BOOLDescription: Binary input for fast shutter controller fault |

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| **Hardware Output Type**TYPE FastShutterControlOutStruct :STRUCT UpDrive: BOOL;DownDrive: BOOL; END\_STRUCTEND\_TYPE |
| Type name | FastShutterControlOutStruct |
| Description | Structure of the hardware output that are wired up for the shutter control |
| Definition | STRUCT |
| Element | Name: UpDriveType: BOOLDescription: Fast shutter moves to blocking position |
| Element | Name: DownDriveType: BOOLDescription: Fast shutter moves to unblocking position |

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| **User Interface Type**TYPE FastShutterControlStruct :STRUCTError: ErrorStruct;Ready: BOOL;State: ShutterControlStateEnum;Mode: ShutterControlModeEnum;ForceOpen: BOOL;END\_STRUCTEND\_TYPE |
| Type name | FastShutterControlStruct |
| Description | Structure of the user interface tags that are used to control the fast shutter control |
| Definition | STRUCT |
| Output Tag | Name: ErrorType: ErrorStructDescription: For error handling |
| Output Tag | Name: ReadyType: BOOLDescription: Shutter is ready for operation (HV caps are charged) |
| Output Tag | Name: StateType: ShutterControlStateEnumDescription: State of the shutter |
| Input Tag | Name: ModeType: ShutterControlModeEnumDescription: Requested shutter mode (block or unblock) |
| Input Tag | Name: ForceOpenType: BOOLDescription: Force open when shutter is stuck |

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| **Function Block**FUNCTION\_BLOCK FastShutterControlFBVAR\_INPUT Request: SaveRestoreEnum; ShutterControl: ShutterControlStruct FastShutterControlIn: FastShutterControlInStruct;END\_VARVAR\_OUTPUT FastShutterControlOut: FastShutterControlOutStruct;END\_VARVAR\_IN\_OUT FastShutterControlInit: FastShutterControlStruct; FastShutterControl: FastShutterControlStruct;END\_VAR |
| Name | FastShutterControlFB |
| Description | Controls the fast shutter |
| Input argument | Name: RequestType: SaveRestoreEnumDescription: Request save/restore/safemode or noop |
| Input argument | Name: ShutterControlType: ShutterControlStructDescription: shutter controller for trigger logic |
| Input argument | Name: FastShutterControlInType: FastShutterControlInStructDescription: Input hardware structure |
| Output argument | Name: FastShutterControlOutType: FastShutterControlOutStructDescription: Output hardware structure |
| In/out argument | Name: FastShutterControlInitType: FastShutterControlStructDescription: Save/restore variable in persistent memory |
| In/out argument | Name: FastShutterControlType: FastShutterControlStructDescription: User Interface structure for fast shutter |