*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 controller  See 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: ShutterUnblock  Description: Unblock the fast shutter |
| Element | Name: ShutterBlock  Description: Block the fast shutter |

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

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

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| **User Interface Type**  TYPE FastShutterControlStruct :  STRUCT  Error: ErrorStruct;  Ready: BOOL;  State: ShutterControlStateEnum;  Mode: ShutterControlModeEnum;  ForceOpen: BOOL;  END\_STRUCT  END\_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: Error  Type: ErrorStruct  Description: For error handling |
| Output Tag | Name: Ready  Type: BOOL  Description: Shutter is ready for operation (HV caps are charged) |
| Output Tag | Name: State  Type: ShutterControlStateEnum  Description: State of the shutter |
| Input Tag | Name: Mode  Type: ShutterControlModeEnum  Description: Requested shutter mode (block or unblock) |
| Input Tag | Name: ForceOpen  Type: BOOL  Description: Force open when shutter is stuck |

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| **Function Block**  FUNCTION\_BLOCK FastShutterControlFB  VAR\_INPUT  Request: SaveRestoreEnum;  ShutterControl: ShutterControlStruct  FastShutterControlIn: FastShutterControlInStruct;  END\_VAR  VAR\_OUTPUT  FastShutterControlOut: FastShutterControlOutStruct;  END\_VAR  VAR\_IN\_OUT  FastShutterControlInit: FastShutterControlStruct;  FastShutterControl: FastShutterControlStruct;  END\_VAR | |
| Name | FastShutterControlFB |
| Description | Controls the fast shutter |
| Input argument | Name: Request  Type: SaveRestoreEnum  Description: Request save/restore/safemode or noop |
| Input argument | Name: ShutterControl  Type: ShutterControlStruct  Description: shutter controller for trigger logic |
| Input argument | Name: FastShutterControlIn  Type: FastShutterControlInStruct  Description: Input hardware structure |
| Output argument | Name: FastShutterControlOut  Type: FastShutterControlOutStruct  Description: Output hardware structure |
| In/out argument | Name: FastShutterControlInit  Type: FastShutterControlStruct  Description: Save/restore variable in persistent memory |
| In/out argument | Name: FastShutterControl  Type: FastShutterControlStruct  Description: User Interface structure for fast shutter |