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TwinCAT Library for   
PZT Shutter

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| **Library** | |
| Title | PztShutter |
| Version | 1 |
| TwinCAT version | 2.11 |
| Name space | – |
| Author | Daniel Sigg |
| Description | Monitors the PZT shutter controller  The PZT shutter is a 5V step down to 0 upon lock loss on one of the OMC PZTs. |
| Error codes | 1 — Limits (PZT not at 5V) |
| Library dependencies | Error, ReadADC, WriteADC, SaveRestore |

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| **Shutter State**  TYPE PztStateEnum : (  PztStateUnknown, (\* Unknown \*)  PztStateOpen, (\* Open \*)  PztStateClosed (\* Closed \*)  );  END\_TYPE | |
| Type name | PztStateEnum |
| Description | Enumerates over shutter states |
| Definition | ENUM |
| Element | Name: PztStateUnknown  Description: Unknown state |
| Element | Name: PztStateOpen  Description: PZT at 5V (nominal OMC lock position) |
| Element | Name: PztStateClosed  Description: PZT at 0V (OMC should be unlocked) |

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| **Limits Check**  TYPE PztLimitsEnum : (  PztLimitsNone, (\* None \*)  PztLimitsLow, (\* Low \*)  PztLimitsHigh, (\* High \*)  PztLimitsHiLo (\* HiLo \*)  );  END\_TYPE | |
| Type name | PztLimitsEnum |
| Description | Enumerates over available limit checks |
| Definition | ENUM |
| Element | Name: PztLimitsNone  Description: No checks are performed |
| Element | Name: PztLimitsLow  Description: Check that value is above lower limit |
| Element | Name: PztLimitsHigh  Description: Check that value is below higher limit |
| Element | Name: PztLimitsHiLo  Description: Check that value is within the limits |

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| **Hardware Input Type**  TYPE PztShutterInStruct :  STRUCT  Volts: INT;  END\_STRUCT  END\_TYPE | |
| Type name | PztShutterInStruct |
| Description | Structure of the hardware input that are wired up for the PZT readbacks |
| Definition | STRUCT |
| Element | Name: Volts  Type: INT  Description: Voltage readback of PZT |

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| **User Interface Type**  TYPE PztShutterStruct :  STRUCT  Error: ErrorStruct;  Volts: LREAL;  State: PztStateEnum;  Low: LREAL;  High: LREAL;  Limits: PztLimitsEnum;  Range: BOOL;  Count: UDINT;  Null: LREAL;  Trig: 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: Volts  Type: LREAL  Description: PZT readback voltage |
| Output Tag | Name: State  Type: PztStateEnum  Description: PZT shutter status |
| Input Tag | Name: Low  Type: LREAL  Description: Low limit |
| Input Tag | Name: High  Type: LREAL  Description: High limit |
| Input Tag | Name: Limits  Type: PztLimitsEnum  Description: Selected limits to check |
| Output Tag | Name: Range  Type: BOOL  Description: Shutter is not in high state (out of range) |
| Output Tag | Name: Count  Type: UDINT  Description: Counts number of limit violation |
| Input Tag | Name: Null  Type: LREAL  Description: Null threshold for PZT (abs value) |
| Output Tag | Name: Trig  Type: BOOL  Description: Shutter triggered (0V state) |

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| **Function Block**  FUNCTION\_BLOCK PztShutterControlFB  VAR\_INPUT  Request: SaveRestoreEnum;  PztShutterIn: PztShutterInStruct;  END\_VAR  VAR\_IN\_OUT  PztShutterInit: PztShutterStruct;  PztShutter: PztShutterStruct;  END\_VAR  VAR CONSTANT  LowThreshold: LREAL := 4.5;  HighThreshold: LREAL := 5.5;  NullThreshold: LREAL := 0.5;  END\_VAR | |
| Name | PztShutterControlFB |
| Description | Monitors the PZT shutter |
| Input argument | Name: Request  Type: SaveRestoreEnum  Description: Request save/restore/safemode or noop |
| Input argument | Name: PztShutterIn  Type: PztShutterInStruct  Description: Input hardware structure |
| In/out argument | Name: PztShutterInit  Type: PztShutterStruct  Description: Save/restore variable in persistent memory |
| In/out argument | Name: PztShutter  Type: PztShutterStruct  Description: User Interface structure for fast shutter |
| Constant | Name: LowThreshold  Type: LREAL  Value: 4.5  Description: Hardcoded low limit for PZT shutter |
| Constant | Name: HighThreshold  Type: LREAL  Value: 5.5  Description: Hardcoded high limit for PZT shutter |
| Constant | Name: NullThreshold  Value: 0.5  Description: Hardcoded null limit for PZT shutter |