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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 controllerThe 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: PztStateUnknownDescription: Unknown state |
| Element | Name: PztStateOpenDescription: PZT at 5V (nominal OMC lock position) |
| Element | Name: PztStateClosedDescription: 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: PztLimitsNoneDescription: No checks are performed |
| Element | Name: PztLimitsLowDescription: Check that value is above lower limit |
| Element | Name: PztLimitsHighDescription: Check that value is below higher limit |
| Element | Name: PztLimitsHiLoDescription: Check that value is within the limits |

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| **Hardware Input Type**TYPE PztShutterInStruct :STRUCT Volts: INT;END\_STRUCTEND\_TYPE |
| Type name | PztShutterInStruct |
| Description | Structure of the hardware input that are wired up for the PZT readbacks |
| Definition | STRUCT |
| Element | Name: VoltsType: INTDescription: 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\_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: VoltsType: LREALDescription: PZT readback voltage |
| Output Tag | Name: StateType: PztStateEnumDescription: PZT shutter status |
| Input Tag | Name: LowType: LREALDescription: Low limit |
| Input Tag | Name: HighType: LREALDescription: High limit |
| Input Tag | Name: LimitsType: PztLimitsEnumDescription: Selected limits to check |
| Output Tag | Name: RangeType: BOOLDescription: Shutter is not in high state (out of range) |
| Output Tag | Name: CountType: UDINTDescription: Counts number of limit violation |
| Input Tag | Name: NullType: LREALDescription: Null threshold for PZT (abs value) |
| Output Tag | Name: TrigType: BOOLDescription: Shutter triggered (0V state) |

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| **Function Block**FUNCTION\_BLOCK PztShutterControlFBVAR\_INPUT Request: SaveRestoreEnum; PztShutterIn: PztShutterInStruct;END\_VARVAR\_IN\_OUT PztShutterInit: PztShutterStruct; PztShutter: PztShutterStruct;END\_VARVAR 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: RequestType: SaveRestoreEnumDescription: Request save/restore/safemode or noop |
| Input argument | Name: PztShutterInType: PztShutterInStructDescription: Input hardware structure |
| In/out argument | Name: PztShutterInitType: PztShutterStructDescription: Save/restore variable in persistent memory |
| In/out argument | Name: PztShutterType: PztShutterStructDescription: User Interface structure for fast shutter |
| Constant | Name: LowThresholdType: LREALValue: 4.5Description: Hardcoded low limit for PZT shutter |
| Constant | Name: HighThresholdType: LREALValue: 5.5Description: Hardcoded high limit for PZT shutter |
| Constant | Name: NullThresholdValue: 0.5Description: Hardcoded null limit for PZT shutter |