



*LIGO Laboratory / LIGO Scientific Collaboration*

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**TwinCAT Library for ALS State Machine**

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LIGO Scientific Collaboration

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**Library**

Title	ALSStateMachine
Version	1
TwinCAT version	V2.11.0
Name space	
Author	Daniel Sigg
Description	Monitors the state of the ALS machines; reports the state of end station locking
Error Code	None
Library Dependencies	ALSCommunication, ALSLaser, ALSLaserLocking, ALSPDHLocking, WristDAC, CommonMode, DCPower, DelayLogic, Demodulator, Error, FiberDistribution, IscWhitening, LowNoiseVCO, Photodetectors, ReadADC, RFAmplifier, RtCommunications, SaveRetore

**User Interface Type**

TYPE ALSLockEndStruct :

STRUCT

```

    Enable:                BOOL;
    StateRequest:          ALSEndStateEnum;
    State:                  ALSEndStateEnum;

```

END\_STRUCT;

END\_TYPE;

Type Name	ALSLockEndStruct
Description	Structure used in the user interface type to monitor the end station locking
Definition	STRUCT
Input Tag	Name: Enable Type: BOOL Description: Enable button
Input Tag	Name: StateRequest Type: LREAL Description: Request a state for the ALS end machine
Output Tag	Name: State Type: ALSEndStateEnum Description: End station locking state

**User Interface Type**

TYPE ALSLockStruct :

STRUCT

```

    RequestX:              ALSEndStateEnum;
    RequestY:              ALSEndStateEnum;

```

```

        StateX:          ALSEndStateEnum;
        StateY:          ALSEndStateEnum;
        Overall:         ALSCornerStateEnum;
END_STRUCT;
END_TYPE;
Type Name              ALSLaserLockingFiberStruct
Description            Structure used in the user interface type to monitor the end station locking
Definition             STRUCT
Input Tag              Name: RequestX
                      Type: ALSEndStateEnum
                      Description: Request a state for the ALS EX machine
Input Tag              Name: RequestY
                      Type: ALSEndStateEnum
                      Description: Request a state for the ALS EY machine
Output Tag             Name: StateX
                      Type: ALSEndStateEnum
                      Description: EX station locking state
Output Tag             Name: StateY
                      Type: ALSEndStateEnum
                      Description: EY station locking state
Output Tag             Name: Overall
                      Type: ALSCornerStateEnum
                      Description: Corner station locking state

```

**Function Block**

```

TYPE ALSStateMachineEndFB:
VAR_IN_OUT
    PLLLocking:        ALSLaserLockingStruct;
    PDHLocking:        ALSPDHLockingStruct;
    ALSEndLock:        ALSLockEndStruct;
END_VAR;
END_TYPE;
Type Name              ALSFrequencyFB
Description            Function block used to monitor the VCO and beat note frequencies
Definition             Function Block
In/out Argument       Name: PLLLocking
                      Type: ALSLaserLockingStruct
                      Description: User interface structure to monitor PLL locking
In/out Argument       Name: PDHLocking
                      Type: ALSPDHLockingStruct
                      Description: User interface structure to monitor PDH locking

```

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In/out Argument

Name: ALSEndLock

Type: ALSLockEndStruct

Description: User interface structure