

Function name: **LM – Light curtain muting**

Example - architecture of category 4 to EN 954-1 and ISO 13849-1

Access control of an area with a 2-channel light curtain. The protective function is bridged automatically by 2 muting sensors arranged in parallel and reactivated when the transported material has passed through.

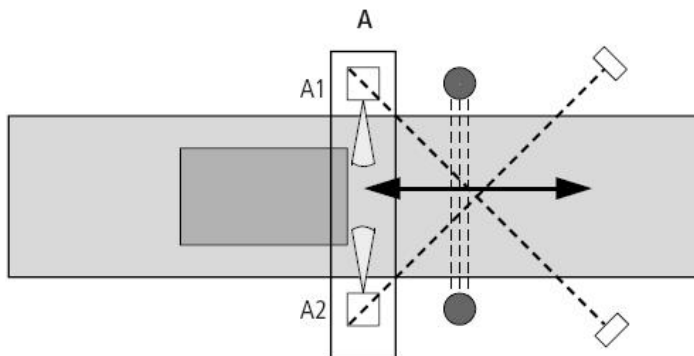


Figure 1: Arrangement for muting with 2 muting sensors

An override button enables the conveyed material to be moved out of the hazardous area during muting in the event of damage.

MST (Manual Start) mode is selected in order to avoid an automatic enabling after the occurrence of faults or the interruptions in the light curtain.

Cross-circuit monitoring of the external wiring is implemented using the test signals and also the monitoring of the following times are set.

- Discrepancy time DT: 0.5 s.
- Muting time MT: 60 s.
- Synchronization time ST: 1 s.
- Override release time RT: 60 s.

The connections are implemented as follows:

- Enable contacts of the B1 light curtain to the device terminals IS5 and IS6.
- Muting sensors B2 and B3 to IS10 and IS14.
- Override key switch to IS1.
- The feedback loop including Reset button to IS2.

The safety relay outputs QS1 and QS2 switch contactors Q1 and Q2 directly.

This looks as follows in the electrical circuit diagram:



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The signal diagram of the function block for this application shows:

- the dependence of the enable contact LM01QS on the status of the following coils:

- LM01I1 and LM01I2.
- LM01A1 and LM01A2.
- LM01RE.
- LM01OV.

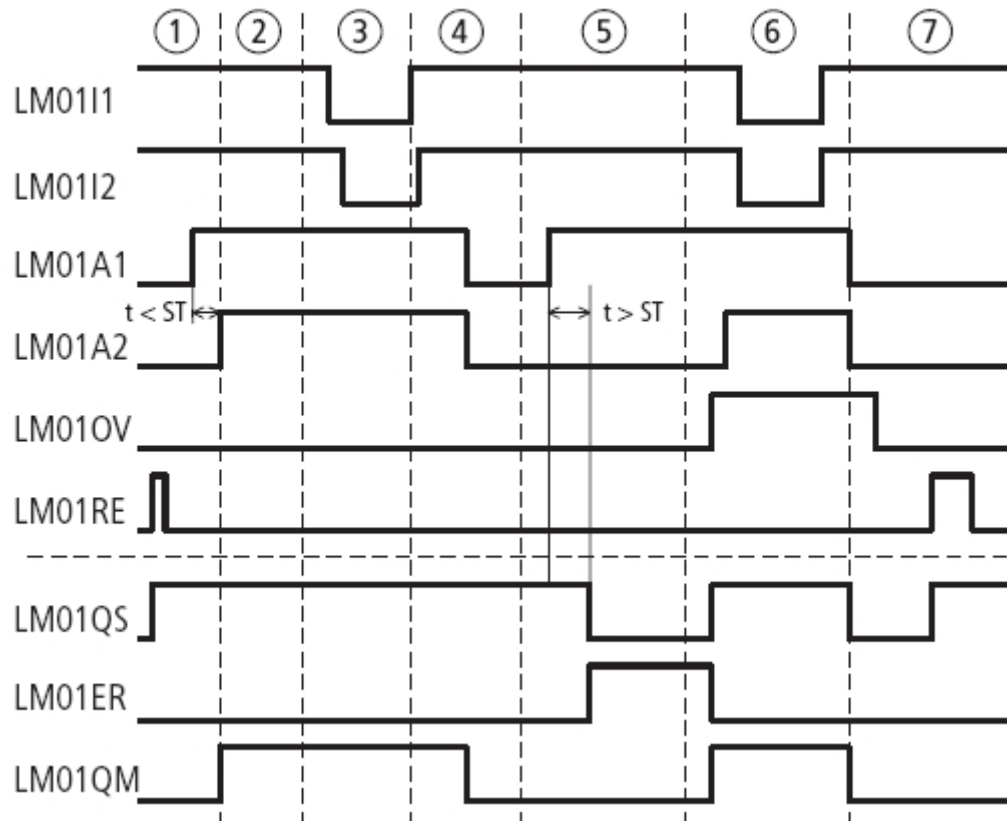


Figure 2: Signal diagram

- Manual start and subsequent entry of the transported material in the muting area.
- Muting mode active.
- Transported material interrupts light curtain.
- Transported material leaves the light curtain and muting area. The exit of the transported material ends the muting mode.
- The subsequent transported material tilts so that the status of the second muting sensor A2 cannot follow the status change of the muting sensor A1 within the synchronisation time ST. The enable at LM01QS is removed and the error is signalled via LM01ER.
- Actuating the override key switch (LM01OV) enables the transported material to be moved through the light curtain. If the default state is reached again (light curtain and muting sensors clear), the enable at LS01QS is removed again as MST (Manual Start) is set.

Please note: The master-password for the example file is: "111111".