

Function name: **EM – Feedback loop monitoring**

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

Monitoring of the switch position change of two contactors with cross-circuit monitoring of the external wiring. The safety output of an ES01QS emergency-stop function block switches the EM01 OC coil and activates the function block. The enable must be removed if the feedback signal for the contactor switch position is delayed. The monitoring time is set to 2.5 seconds.

Note that the emergency-stop function block is in AST (Automatic Start) mode. Manual enabling is only possible via the Reset coil of the EM function block. If the safety application does not have an EM function block, the emergency-stop function block should be set to MST or CST mode in order to prevent unwanted enabling after the emergency-stop actuator is released.

This looks as follows in the electrical circuit diagram:

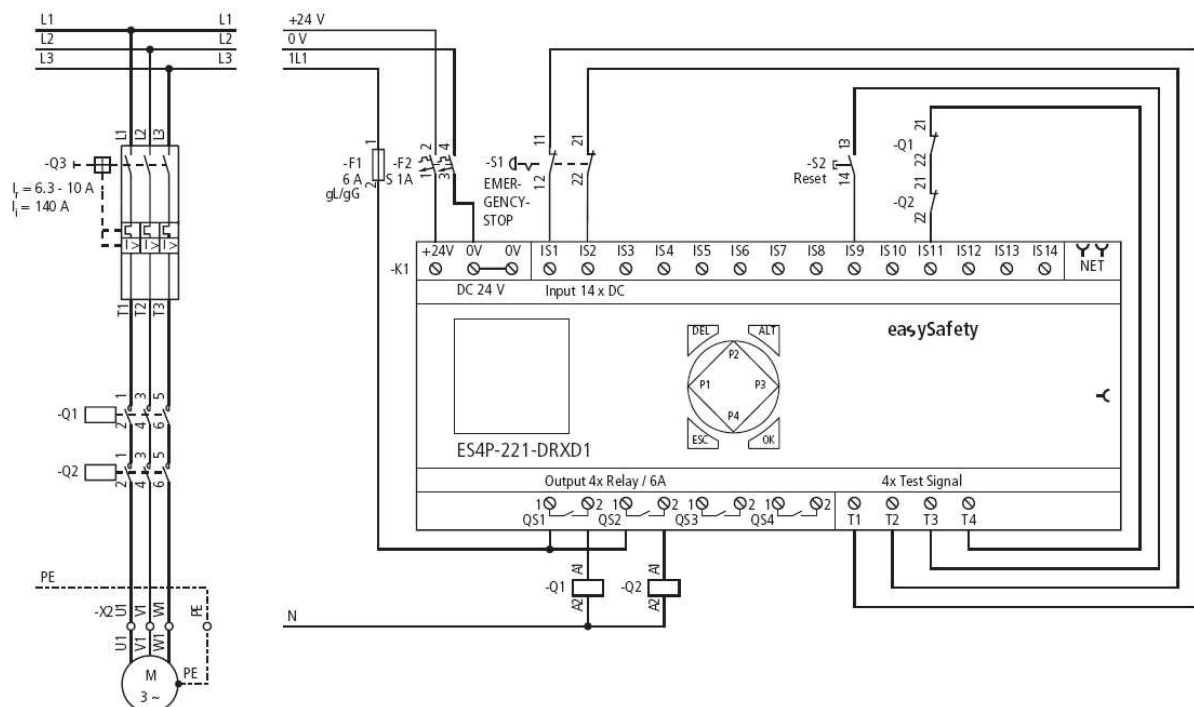


Figure 1: Electrical circuit diagram

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

- the dependence of the enable contact of EM01QS on the state of coils EM01OC and EM01FL.
- the relationship between exceeded monitoring time EM01DT and the error output EM01ER.
- the error acknowledgement with coil EM01RE.
- the re-enabling when the EM01RE reset coil picks up.

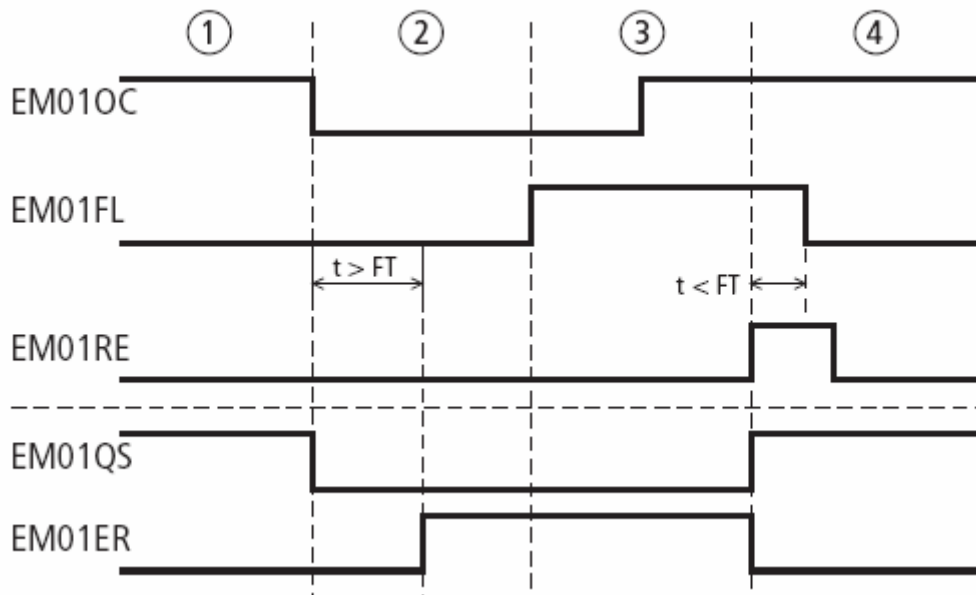


Figure 2: Signal diagram

- 1 Normal operation, emergency-stop not actuated
- 2 Emergency-stop actuated -> 0 signal at EM01OC -> EM01QS switches off the device outputs -> Feedback loop not active within the monitoring time (contactor stuck) -> EM01ER error output active.
- 3 Fault in feedback loop rectified, emergency-stop released, resulting in a 1 signal at EM01OC.
- 4 Actuating the Reset button clears the error status, the device outputs are switched on and the feedback loop opens within the monitoring time.

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