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RE : Commissioning checklist for the Robot Safety Module AI (CE-SA-017-0001__2)

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1. Introduction

The Robot Safety Module AI is a safety device realizing safety logic.
Therefore, it is essential to verify that it is correctly integrated and that the safety functions that it supports are performed as expected.

2. Supported safety functions

System emergency stop output at the Safety OUT port from the Safety IN port :
When the OSSD signals of the input unit connected to the safety IN port go low, the OSSD signals at the Safety OUT port go low.
This function is latched. It means that the OSSD signals of the Safety OUT port cannot be closed until a reset is requested.

System emergency stop output at the To Robot port from the Safety IN port:
When the OSSD signals of the input unit connected to the safety IN port go low, the redundant dry contact controlling the Emergency stop signals at the To Robot port open.
This function is latched. It means that the dry contacts of the To Robot port cannot be closed until a reset is requested.

System emergency stop output at the Safety OUT port from the From Robot port :
When the Robot goes in Emergency stop and the OSSD signals of the From Robot port go low, the OSSD signals at the Safety OUT port go low.
This function is latched. It means that the OSSD signals of the safety OUT port cannot be closed until a reset is requested.

Redundant safe signal at the From Robot port from the Reduced port :
When the OSSD signals of the input unit connected to the Reduced port go low, the redundant dry contact controlling the Reduced safety signals at the From Robot port open.
This function is latched. It means that the dry contacts of reduced safety signals at the From Robot port cannot be closed until a reset is requested.

System reset propagation from the Safety IN port to the Safety OUT port :
When a reset signal is received from the Safety IN port, a reset signal is sent to the Safety OUT port.

System reset propagation from the Safety IN port to the To Robot port :
When a reset signal is received from the Safety IN port, a reset signal is sent to the To Robot port.

3. Checklist

Compliance to the requirements of table 1 shall be verified

Table 1 Commissioning checklist for safety

Requirement	Description	YES	NO	N/A	Comments / Reference
System ES from Safety IN	4.1				
System ES - From Robot	4.2				
Reduced mode	4.3				
System reset propagation	4.4				

Signature

Name	
Function / Title	
Signature	

4. Procedures

4.1. System ES from Safety IN

The state of the redundant safety signal of the Safety IN port is propagated to the Safety OUT and To Robot ports. This safety function shall be verified as per the following procedure.

Procedure :
Install a estop-reset-module upstream to the module (Safety IN port):

- Press the emergency stop button;
- Release the emergency stop button;
- Press the reset button of the estop-reset-module.

Behavior :
Following the above procedure, the system emergency stop shall be activated and reseted :

- When pressing the emergency button or activating the system emergency stop at the Safety IN port, the LED shall turn solid red and the connected end effectors (Machine Motion and robot) shall goes in emergency stop;
- When releasing the emergency button or restoring the system emergency stop signal at the Safety IN port, the LED should turn flashing red;
- When pressing the reset button, the LED should go back to solid green

4.2. System ES - From Robot

The emergency stop state form the Robot controller is propagated to the Safety OUT port. This safety function shall be verified as per the following procedure.

Procedure :
Install a estop-reset-module upstream to the module (Safety IN port) and using the robot pendant :

- Press the emergency stop button of the robot pendant;
- Release the emergency stop button of the robot pendant ;
- Press the reset button of the estop-reset-module.

Behavior :
Following the above procedure, the system emergency stop shall be activated and reseted :

- When pressing the emergency button of the pendant of the robot controller, the LED shall turn solid red and the connected end effectors (Machine Motion) shall goes in emergency stop;
- When releasing the emergency button of the pendant, the LED should turn flashing red;

- When pressing the reset button, the LED should go back to solid green.

4.3. Reduced mode

If the reduced port of the RSM AI is used, the reduced mode activation shall be verified as per the following procedure.

Procedure :
Using the detection devices connected upstream of the reduced port of the RSM :

- Break the detection device (light curtain or area scanner);
- Unbreak the detection device;
- If the detection device is connected to the Muting Safety Module AI, press the reset button of the estop-reset-module.

Behavior :
Following the above procedure, the robot should be in collaborative mode and get back to normal operation :

- When breaking the detection device, depending on the selected connection :
  - The robot should go in collaborative mode or protective stop. Verify the robot state on the robot pendant;
  - The LED shall flash BLUE; and
  - The state of the MachineMotion should not change.
- When unbreaking the detection device :
  - If the device is connected to the Auto-Reset Module AI, after 5 seconds, the LED shall turn to GREEN and the robot should resume normal mode;
  - If the device is connected to the Muting Safety Module AI, the LED should remain flashing BLUE
- When pressing the reset button, the LED should go back to solid green.

4.4. System reset propagation

The reset propagation is verified with the reset of other modules or the MachineMotion.
When performing 4.1 and 4.2, verify if other modules and the MachineMotion (if applicable) reset.