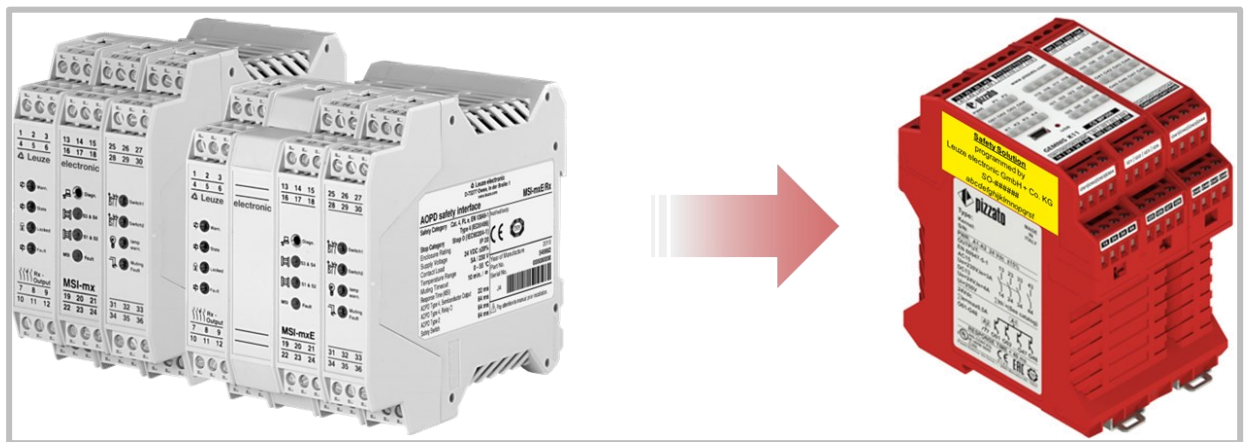


Simple – Safe – Productive

SYS-HAMT-P1-000-... **MSI-m and MSI-mx replacement**



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1. About this document

In this instruction, you will find information that is required for replacing former MSI-m(E)/R and MSI-mx(E)/Rx series with new spare part devices
SYS-HAMT-P1-000-....

NOTICE



The MSI-m(E)/R and MSI-mx(E)/Rx series has been phased out by November 2024.

1.1. Other applicable documents

This document contains only the most important facts and information regarding the replacement of the former components with the legacy component.

↳ Observe the operating instructions of the current component in use.

Tab. 1.1: Documentation about components

Document type	Title	Product model, series
Operating instruction www.leuze.com	Leuze Modular Safety Interface	MSI-mx/Rx MSI-mxE/Rx
Operating instruction www.pizzato.com	Pizzato Programmable multifunction safety module	CS MP306MO

⚠ WARNING



The use of differing individual components may result in serious or fatal injuries

If a component other than described here are used, you are responsible for the proper handling, cabling and wiring. Leuze electronic GmbH + Co. KG provides no guarantee and accepts no liability in this case.

↳ For the replacement of the former components, use only the components described in this document.

1.2. Used symbols and signal words

Tab. 1.2: Warning symbols and signal words

	Symbol indicating dangers to persons
Warning	Signal word for serious injury It indicates dangers that may result in severe or fatal injury if the measure for danger avoidance is not followed.
	Symbol indicating possible property damage
Note	Signal word for property damage It indicates dangers that may result in property damage if the measures for danger avoidance are not followed.

Tab. 1.3: Other symbols

	Symbol for tips
↳	Symbol for action steps Text passages with this symbol instruct you to perform actions

1.3. Discontinued components

Tab. 1.4: Discontinued components

Order no.	Type
549904	MSI-m/R
549980	MSI-mE/R
549905	MSI-mx/Rx
549982	MSI-mxE/Rx

1.4. Replacement components

As a 1:1 replacement is unfortunately not possible, Leuze offers two control units with different programming as spare parts. The necessary rewiring is shown in the following tables.

NOTICE



Check, for which intended application use the MSI-m device(s) is configured (T- or X-Muting). (see Tab. 1.5)

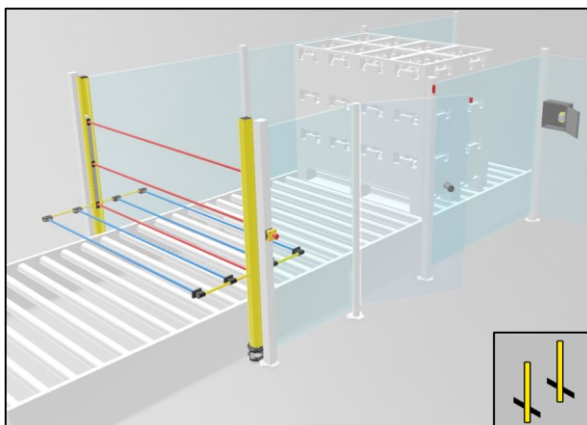
T-Muting: Four muting sensors are arranged parallel in a row IIII, like an inverted "T". The AOPD is placed between two sensors on each side.

X-Muting: Two muting sensors are offset diagonally, like an "X". The AOPD is placed in the middle of the offset sensors.

Accordingly, you have to select the corresponding replacement device.

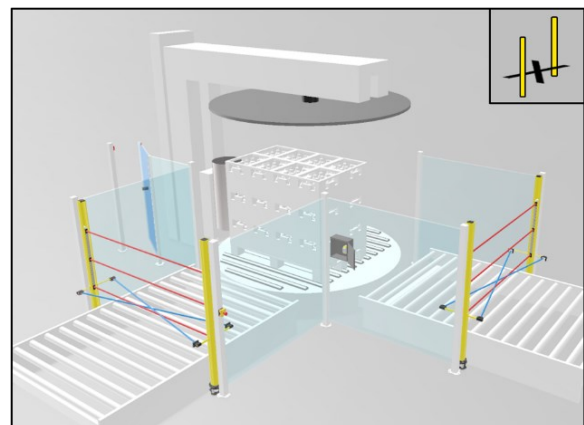
Tab. 1.5: Overview of the different legacy components

4-Sensor Muting (sequence-controlled)
("T"-Muting)



Order no.: **SO-000133**
Type: **SYS-HAMT-P1-000-001**

up to **2x 2-Sensor Muting** (time-controlled)
("X"-Muting)



Order no.: **SO-000134**
Type: **SYS-HAMT-P1-000-002**

NOTICE



Both replacement devices don't provide any DIP-switches to configure the device functions. You must wire inputs of the replacement device accordingly.

2. Rewiring Current Installation

NOTICE



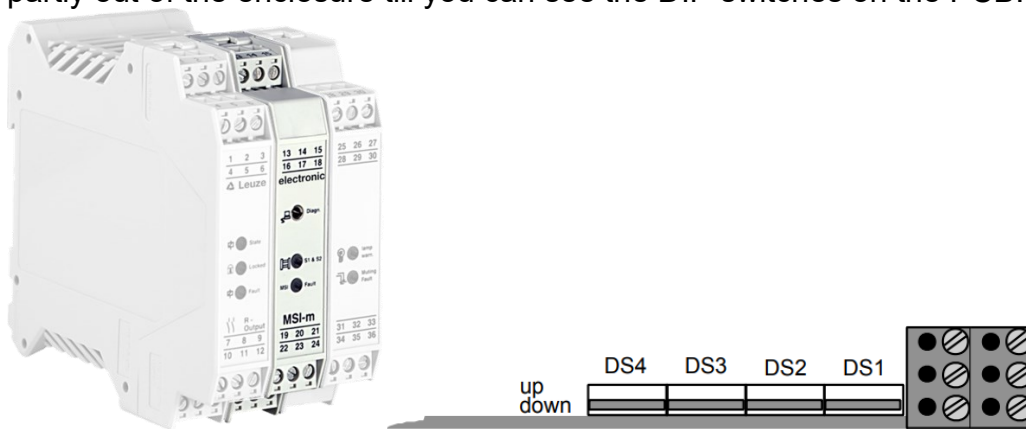
Before proceeding, check the installation of your system and configuration of the DIP-switches in the MSI-m(E)/R and MSI-mx(E)/Rx device.

There are two DIP-switch configurations you have to check.

2.1. For MSI-m(E)/R replacement (549904 - MSI-m/R, 549980 - MSI-mE/R)

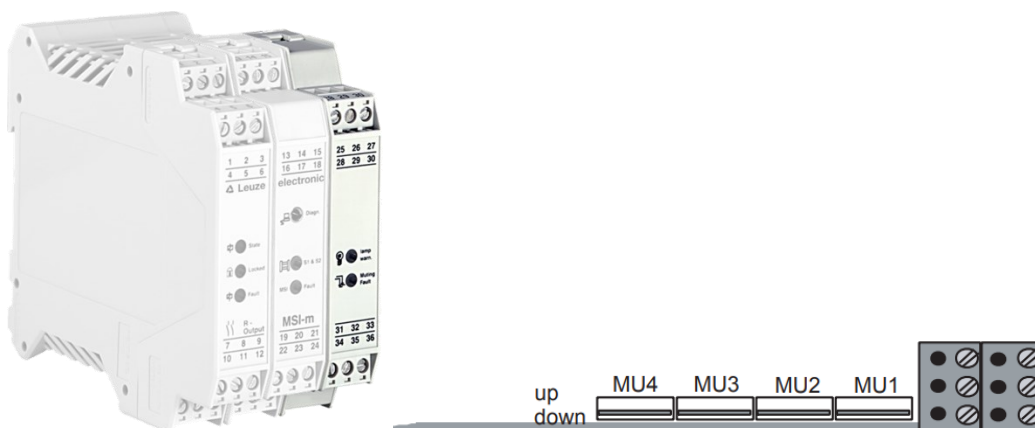
2.1.1. DIP-switch configuration of MSI-m module

To Check the DIP switch settings: cut off the voltage supply to the interface, loosen the mounting taps of the middle segment with the imprint “MSI-m” and lift this module partly out of the enclosure till you can see the DIP switches on the PCB.



2.1.2. DIP-switch configuration of MSI-m I/O module

To Check the DIP switch settings: cut off the voltage supply to the interface, loosen the mounting taps of the segment right to the MSI-m module element and lift this module partly out of the enclosure till you can see the DIP switches on the PCB.

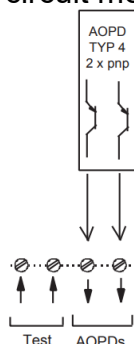


2.1.3. Device configurations and setups of MSI-m(E)/R that can be replaced

	Pre-condition	SO-000133												
AOPD	Type 4	1x AOPD												
Start/restart	Interlock	<i>DIP-switch configuration of MSI-m module (see 2.1)</i> <table><tr><th>Not used</th><th>Restart interlock</th><th>EDM monitoring</th><th>Not used</th></tr><tr><td>DS4</td><td>DS3</td><td>DS2</td><td>DS1</td></tr><tr><td></td><td> OFF active</td><td> static dynamic</td><td></td></tr></table>	Not used	Restart interlock	EDM monitoring	Not used	DS4	DS3	DS2	DS1		OFF active	static dynamic	
Not used	Restart interlock		EDM monitoring	Not used										
DS4	DS3	DS2	DS1											
	OFF active	static dynamic												
EDM monitoring	Dynamic ('static' is in principle also possible)													
Muting area 1	S1&S2	<i>DIP-switch configuration of MSI-m I/O module (see 2.1.2)</i> <table><tr><th>Muting area 1</th><th>Muting sensors</th><th>Muting time limit</th><th>Muting function</th></tr><tr><td>MU4</td><td>MU3</td><td>MU2</td><td>MU1</td></tr><tr><td> S1 only S1&S2</td><td> Non-testable testable</td><td> Without 10 min</td><td> Without Muting area 1</td></tr></table>	Muting area 1	Muting sensors	Muting time limit	Muting function	MU4	MU3	MU2	MU1	S1 only S1&S2	Non-testable testable	Without 10 min	Without Muting area 1
Muting area 1	Muting sensors		Muting time limit	Muting function										
MU4	MU3		MU2	MU1										
S1 only S1&S2	Non-testable testable		Without 10 min	Without Muting area 1										
Muting sensors	Non-testable													
*Muting time limit	10 min ('without' is in principle also possible)													
Muting function	Muting area 1													

*Muting time can be configured on the replacement device via input terminal (see 0).

- Only AOPDs type 4 with 2 safety related transistor outputs and internal cross circuit monitoring function are compatible with the replacement devices.



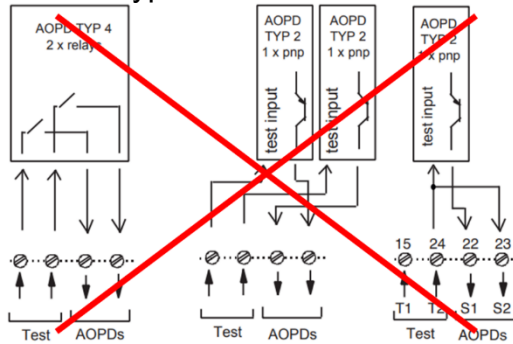
- The restart interlock is pre-configured in the replacement device. An automatic restart in a muting application should be avoided due to high residual risks.
- The pre-configuration of the EDM DIP switch will have no real impact on the setup of replacement device. The replacement device uses the dynamic contactor monitoring in general.

Note	
	Electrical wiring change Ensure that the EDM input signal to the replacement device (terminal I37) is a +24V-signal and not 0V!

- The replacement can only be used with an AOPD type 4 with 2 safety related transistor outputs. This allows only the setting "Muting area 1: S1&S2".
- Only setups with 'non-testable' muting sensors can be used with replacement devices.
- Muting time can be transferred to the replacement device by connecting the input I32 accordingly (see 0).
- The replacement can only be used with an AOPD type 4 with 2 safety related transistor outputs. This allows only the setting "Muting function: Muting area 1".

2.1.4. Device configurations that cannot be replaced

- ~~AOPDs type 4 with two relay outputs and without internal cross-circuit monitoring~~
- ~~AOPDs type 2~~




- ~~Automatic restart function~~
- ~~Testable muting sensors~~

2.1.5. Terminal change MSI-m/R replacement

SYS-HAMT-P1-000-001 #SO-000133 and SYS-HAMT-P1-000-002 #SO-000134

(see chapter 3.1 "Wiring change MSI-m/R")

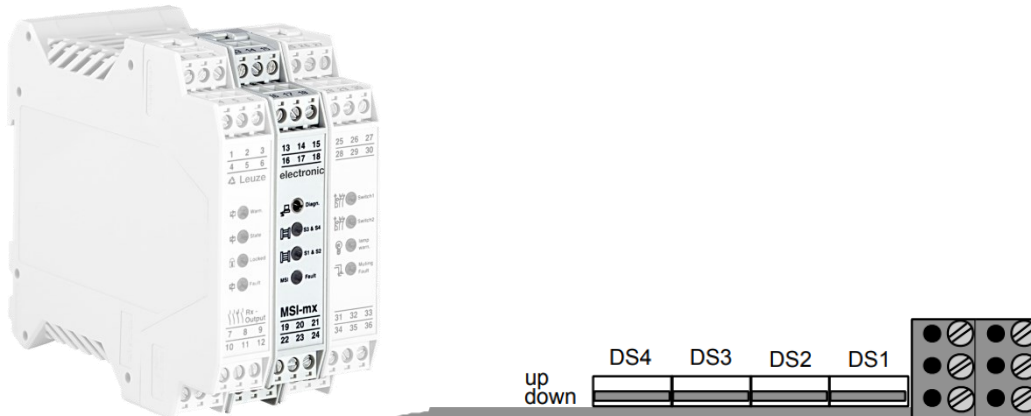
Device terminals			Identifier	Signal	
NEW	MSI-m(E)/R (current) 549904, 549980				
13	◀	11		IN1 _{F-DO1}	24 V
14	◀	10	OSSD1	F-DO1	
23	◀	2		IN2 _{F-DO2}	24 V
24	◀	1	OSSD2	F-DO2	
33 new	◀	-		IN3 _{SSD}	24 V
34 new	◀	-	SSD	DO _{SSD}	
A1	◀	4	+24V	UB	24 V
24V					
A2	◀	9	0V	0V	0 V
0V					
O01	◀	28	Lamp1	Muting Indicator1	24 V
O02	◀	29	Lamp2	Muting Indicator2	
O03	◀	7	State	Switching state F-DO	
O04	◀	6	State	Start/restart interlock	
T11	◀	15	T1	Test	
I15 new					
I17 new					
I23 new	◀	-	+24V		
I24 new	◀	-	+24V		
T12	◀	24	T2	Test	
I16 new					
I18 new					
I25	◀	20	M1	Muting Sensor 1	
I26	◀	21	M2	Muting Sensor 2	
I27	◀	31	M3	Muting Sensor 3	
I28	◀	32	M4	Muting Sensor 4	
I21	◀	22	S1	AOPD1	
I22	◀	23	S2	AOPD2	
* I32	◀	see 2.1.3	DIP switch substitute	max. Muting time	0 V: 10 min 24 V: 100 h
I34 new	◀	┐ Jumper └			
O47 new	◀				
* I35	◀	see 2.1.3	DIP switch substitute	EDM monitoring	0 V: active 24 V: OFF
I36 new	◀	┐ Jumper └			
O48 new	◀				
I37	◀	14	EDM	IN _{EDM}	 24 V
I38	◀	13	Reset	IN _{Reset}	24 V
O41	◀	18	MSI fault	MSI error	
O42	◀	19	S1-S2	Protective fields	
O45	◀	33	Muting Fail.	Muting Error	
O46	◀	5	Warn.	Switching cycles	
T13, T14, 43, 44, I31, I33, O43, O44, O46	◀	not used			

*Terminal I32 and I35 are substitutes for the formerly DIP-switches at the MSI-m(E)/R devices and have to be connected according to DIP-switch setting (see 2.1.3).

2.2. For MSI-mx(E)/Rx replacement (549905 - MSI-mx/Rx, 549982 - MSI-mxE/Rx)

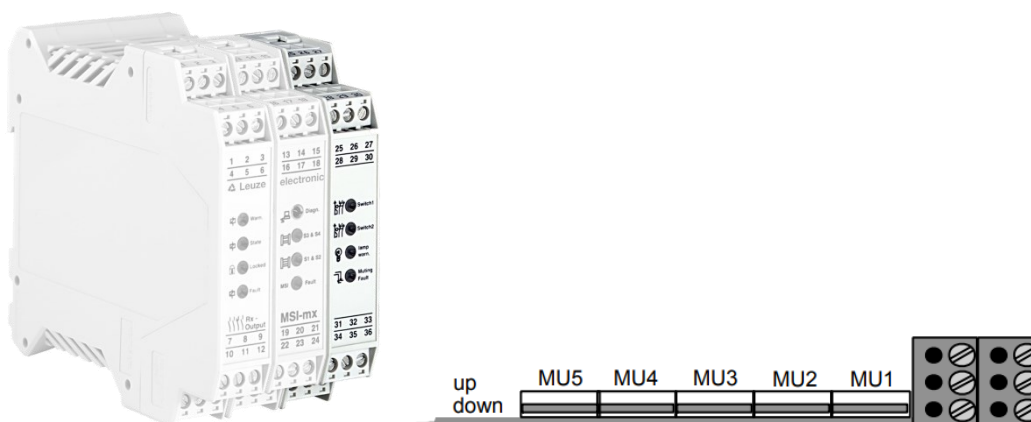
2.2.1. DIP-switch configuration of MSI-mx module

To Check the DIP switch settings: cut off the voltage supply to the interface, loosen the mounting taps of the middle segment with the imprint “MSI-mx” and lift this module partly out of the enclosure till you can see the DIP switches on the PCB.



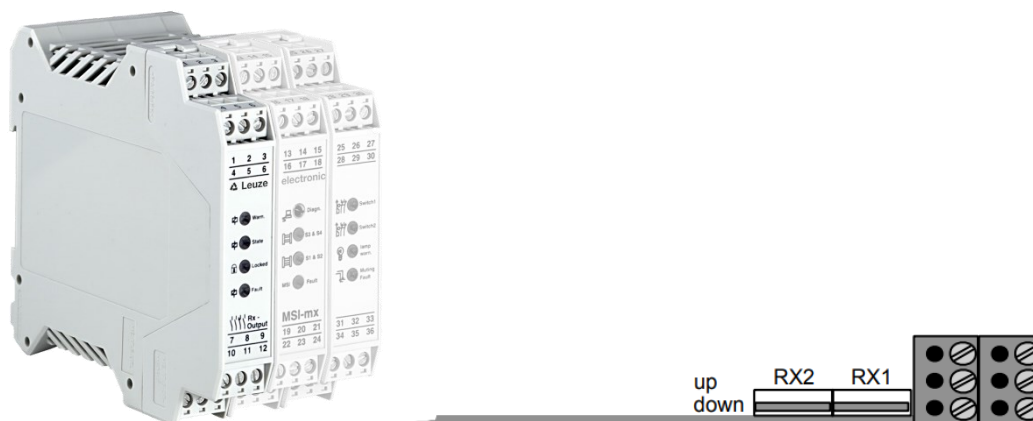
2.2.2. DIP-switch configuration of MSI-mx I/O module

To Check the DIP switch settings: cut off the voltage supply to the interface, loosen the mounting taps of the segment right to the MSI-mx module element and lift this module partly out of the enclosure till you can see the DIP switches on the PCB.



2.2.3. DIP-switch configuration of MSI-mx Rx output module

To Check the DIP switch settings: cut off the voltage supply to the interface, loosen the mounting taps of the middle segment with the imprint “Rx” and lift this module partly out of the enclosure till you can see the DIP switches on the PCB.

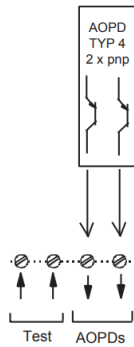


2.2.4. Device configurations and setups of MSI-mx(E)/R that can be replaced

	Pre-condition	SO-000134																				
AOPD	Type 4	1 or 2x AOPD																				
Start/restart	Interlock	DIP-switch configuration of MSI-mx module (see 2.2.1)																				
EDM monitoring	Dynamic ('static' is in principle also possible)	<table><tr><td>Not used</td><td>Restart interlock</td><td>EDM monitoring</td><td>Not used</td></tr><tr><td>DS4</td><td>DS3</td><td>DS2</td><td>DS1</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td>OFF active</td><td>static dynamic</td><td></td></tr></table>	Not used	Restart interlock	EDM monitoring	Not used	DS4	DS3	DS2	DS1						OFF active	static dynamic					
Not used	Restart interlock	EDM monitoring	Not used																			
DS4	DS3	DS2	DS1																			
	OFF active	static dynamic																				
Muting area 2	S3&S4	DIP-switch configuration of MSI-mx I/O module (see 2.2.2)																				
Muting area 1	S1&S2																					
Muting sensors	Non-testable	<table><tr><td>Muting area 2</td><td>Muting area 1</td><td>Muting sensors</td><td>Muting time limit</td><td>Muting function</td></tr><tr><td>MU5</td><td>MU4</td><td>MU3</td><td>MU2</td><td>MU1</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S3 only S3&S4</td><td>S1 only S1&S2</td><td>Non-testable testable</td><td>Without 10 min</td><td>Muting area 1+2 Muting area 1</td></tr></table>	Muting area 2	Muting area 1	Muting sensors	Muting time limit	Muting function	MU5	MU4	MU3	MU2	MU1						S3 only S3&S4	S1 only S1&S2	Non-testable testable	Without 10 min	Muting area 1+2 Muting area 1
Muting area 2	Muting area 1	Muting sensors	Muting time limit	Muting function																		
MU5	MU4	MU3	MU2	MU1																		
S3 only S3&S4	S1 only S1&S2	Non-testable testable	Without 10 min	Muting area 1+2 Muting area 1																		
*Muting time limit	10 min ('without' is in principle also possible)																					
Muting function	Muting area 1+2																					
Warning	#no. of switching cycles	DIP-switch configuration of MSI-mx I/O module (see 2.2.3)																				
		<table><tr><td>Factor 2</td><td>Factor 5</td></tr><tr><td>RX2</td><td>RX1</td></tr><tr><td></td><td></td></tr></table>	Factor 2	Factor 5	RX2	RX1																
Factor 2	Factor 5																					
RX2	RX1																					

*Muting time can be configured on the replacement device via input terminal (see 2.2.6).

- Only AOPDs type 4 with 2 safety related transistor outputs and internal cross circuit monitoring function are compatible with the replacement devices.



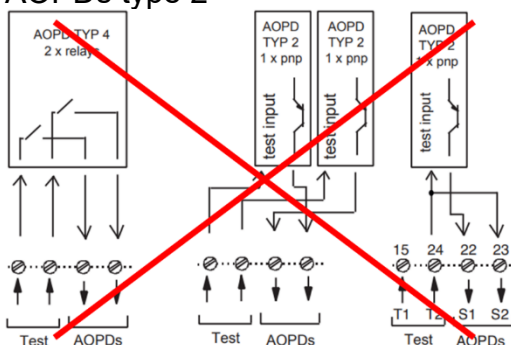
- The restart interlock is pre-configured in the replacement device. An automatic restart in a muting application should be avoided due to high residual risks.
- The pre-configuration of the EDM DIP switch will have no real impact on the setup of replacement device. The replacement device uses dynamic contactor monitoring in general.

Note	
	Electrical wiring change Ensure that the EDM input signal to the replacement device (terminal I37) is a +24V-signal and not 0V!

- The replacement can only be used with an AOPD type 4 with 2 safety related transistor outputs. This allows only the setting “Muting area 2: S3&S4” and “Muting area 1: S1&S2”.
- Only setups with ‘non-testable’ muting sensors can be used with replacement devices.
- Muting time can be transferred to the replacement device by connecting the input I32 accordingly (see 0).
- The replacement can only be used with an AOPD type 4 with 2 safety related transistor outputs.
This allows only the setting “Muting function: Muting area 1+2”.
- The switching cycle DIP switches will have no real impact on the function of replacement device.

2.2.5. Device configurations that cannot be replaced

- ~~AOPDs type 4 with two relay outputs and without internal cross circuit monitoring~~
- ~~AOPDs type 2~~







- ~~Automatic restart function~~
- ~~Testable muting sensors~~
- ~~Switching cycle counter~~

2.2.6. Terminal change MSI-mx/Rx replacement

SYS-HAMT-P1-000-001 #SO-000133 and SYS-HAMT-P1-000-002 #SO-000134

(see chapter 3.2 "Wiring change MSI-mx/Rx")

Device terminals			Identifier	Signal	
NEW		MSI-m(E)/R (current) 549905, 549982			
13	◀	11	OSSD1	IN1 _{F-DO1}	24 V
14	◀	12		F-DO1	
23	◀	2	OSSD2	IN2 _{F-DO2}	24 V
24	◀	1		F-DO2	
33 new	◀		SSD	IN3 _{SSD}	24 V
34	◀	3		DO _{SSD}	
A1	◀	4	+24V	UB	24 V
24V					
A2	◀	9	0V	0V	0 V
0V					
O01	◀	28	Lamp1	Muting Indicator1	24 V
O02	◀	29	Lamp2	Muting Indicator2	
O03	◀	7	State	Switching state F-DO	
O04	◀	6	State	Start/restart interlock	
T11	◀	15	T1	Test	
T12	◀	24	T2	Test	
I15	◀	25	1.1	Safety Switch 1.1	
I16	◀	26	1.2	Safety Switch 1.2	
I17	◀	34	2.1	Safety Switch 2.1	
I18	◀	35	2.2	Safety Switch 2.2	
I21	◀	22	S1	AOPD1.1	
I22	◀	23	S2	AOPD1.2	
I23	◀	16	S3	AOPD2.1	
I24	◀	17	S4	AOPD2.2	
I25	◀	20	M1	Muting Sensor 1	
I26	◀	21	M2	Muting Sensor 2	
I27	◀	31	M3	Muting Sensor 3	0 V: 10 min 24 V: 100 h
I28	◀	32	M4	Muting Sensor 4	
*I32	◀	see 2.1.3	DIP switch substitute	max. Muting time	
I34 new	◀	┌ Jumper			
O47 new	◀				
*I35	◀	see 2.1.3	DIP switch substitute	EDM monitoring	0 V: active 24 V: OFF
I36 new	◀	┌ Jumper			
O48 new	◀				
I37	◀	14	EDM	IN _{EDM}	0V ▶ 24 V
I38	◀	13	Reset	IN _{Reset}	24 V
O41	◀	18	MSI fault	MSI error	
O42	◀	19	S1-S4	Protective fields	
O43	◀	27	1.1-2.2	Safety Switch state	
O44	◀	36	Muting	Muting active	
O45	◀	33	Muting Fail.	Muting Error	
T13, T14, 43, 44, I31, I33, O46	◀	not used			

*Terminal I32 and I35 are substitutes for the formerly DIP-switches at the MSI-m(E)/R devices and have to be connected according to DIP-switch setting (see 2.1.3).

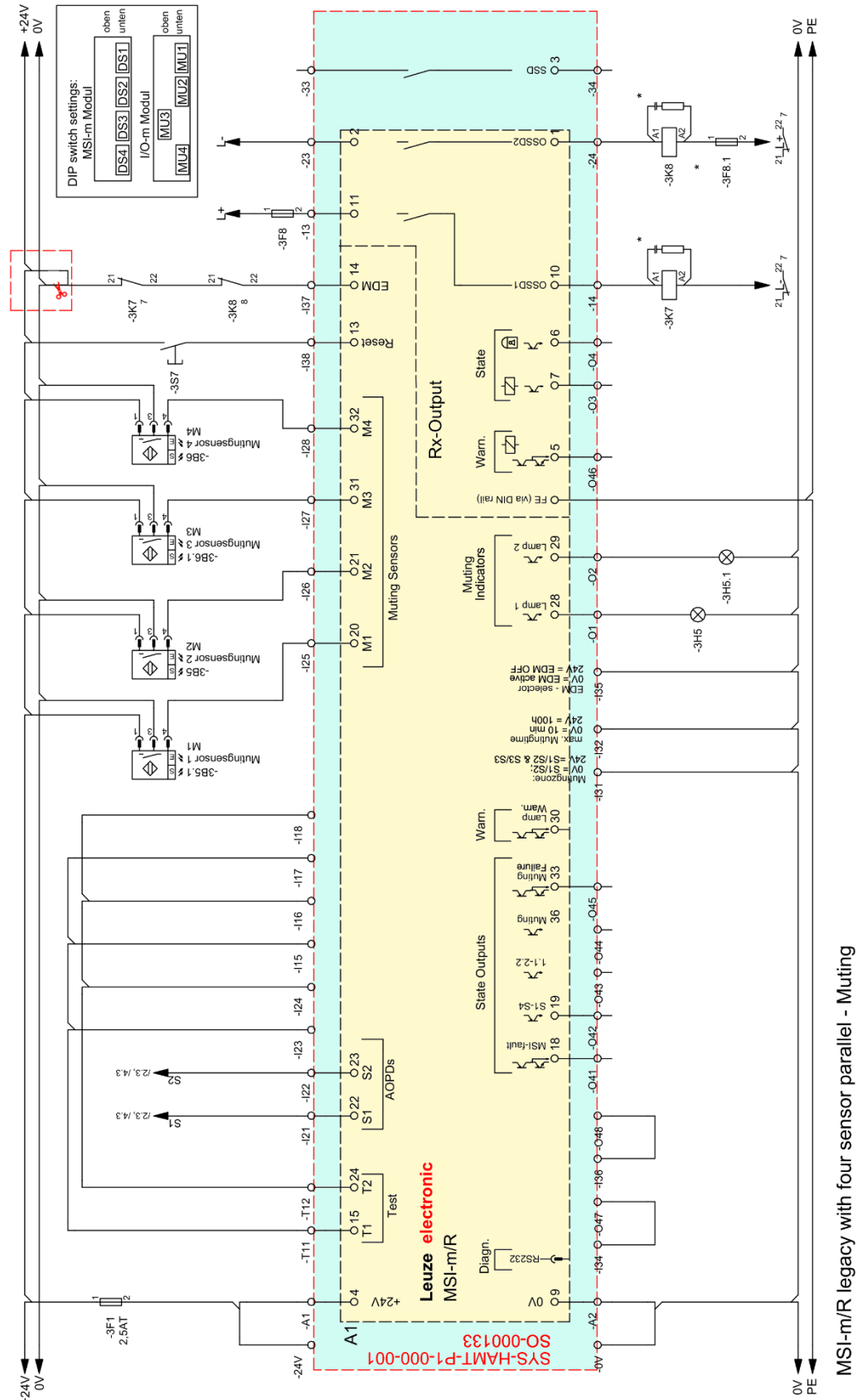
3. Wiring diagram

3.1. Wiring Change MSI-m/R

3.1.1. 1x 4-sensor "T"-muting (sequence-controlled ► SO-000133)

Legend:

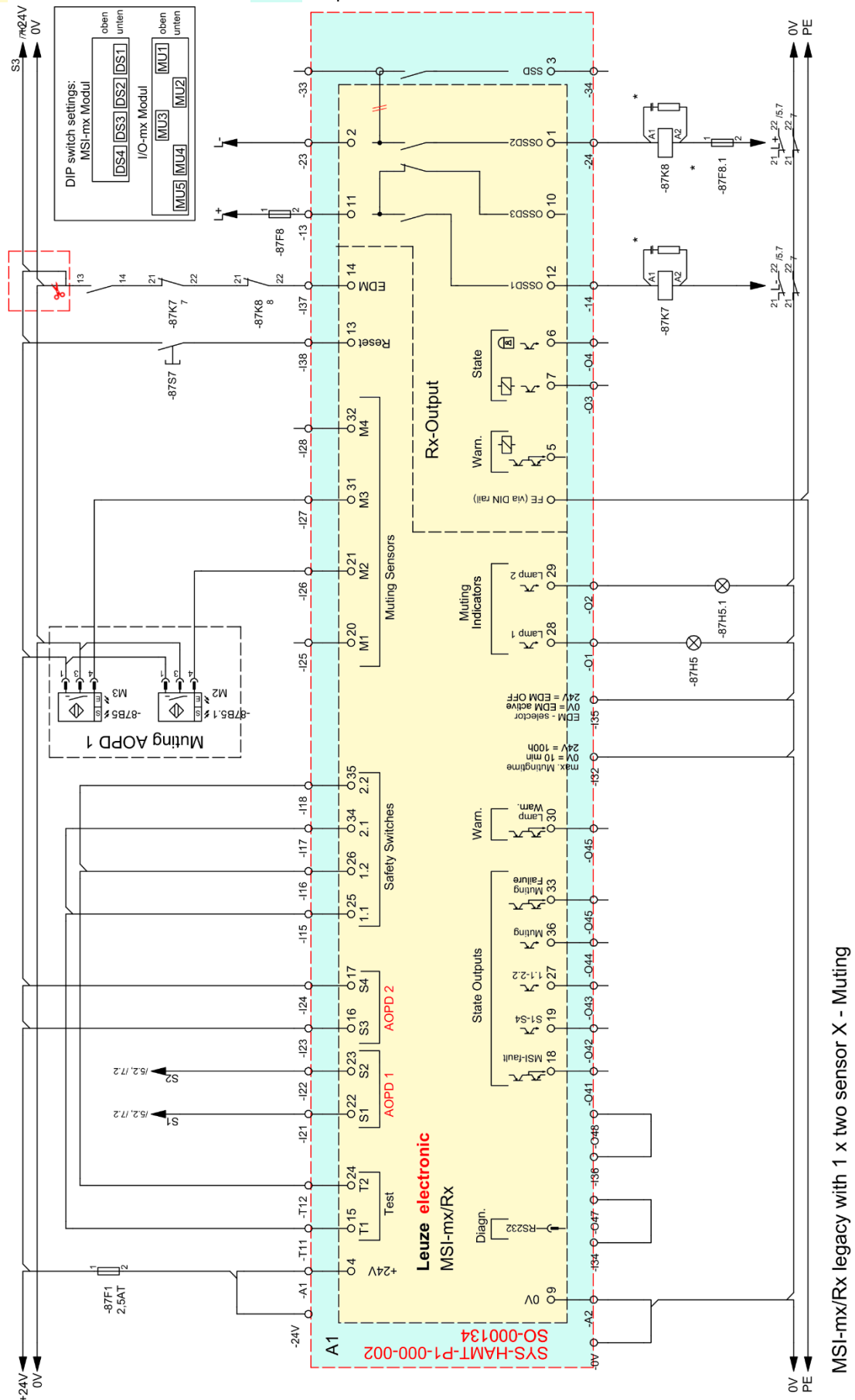
Yellow: Current MSI-m/R device / Green: Replacement SYS-HAMT-P1 device



3.2.2. 1x 2-sensor “X”-muting (time-controlled) ► SO-000134

Legend:

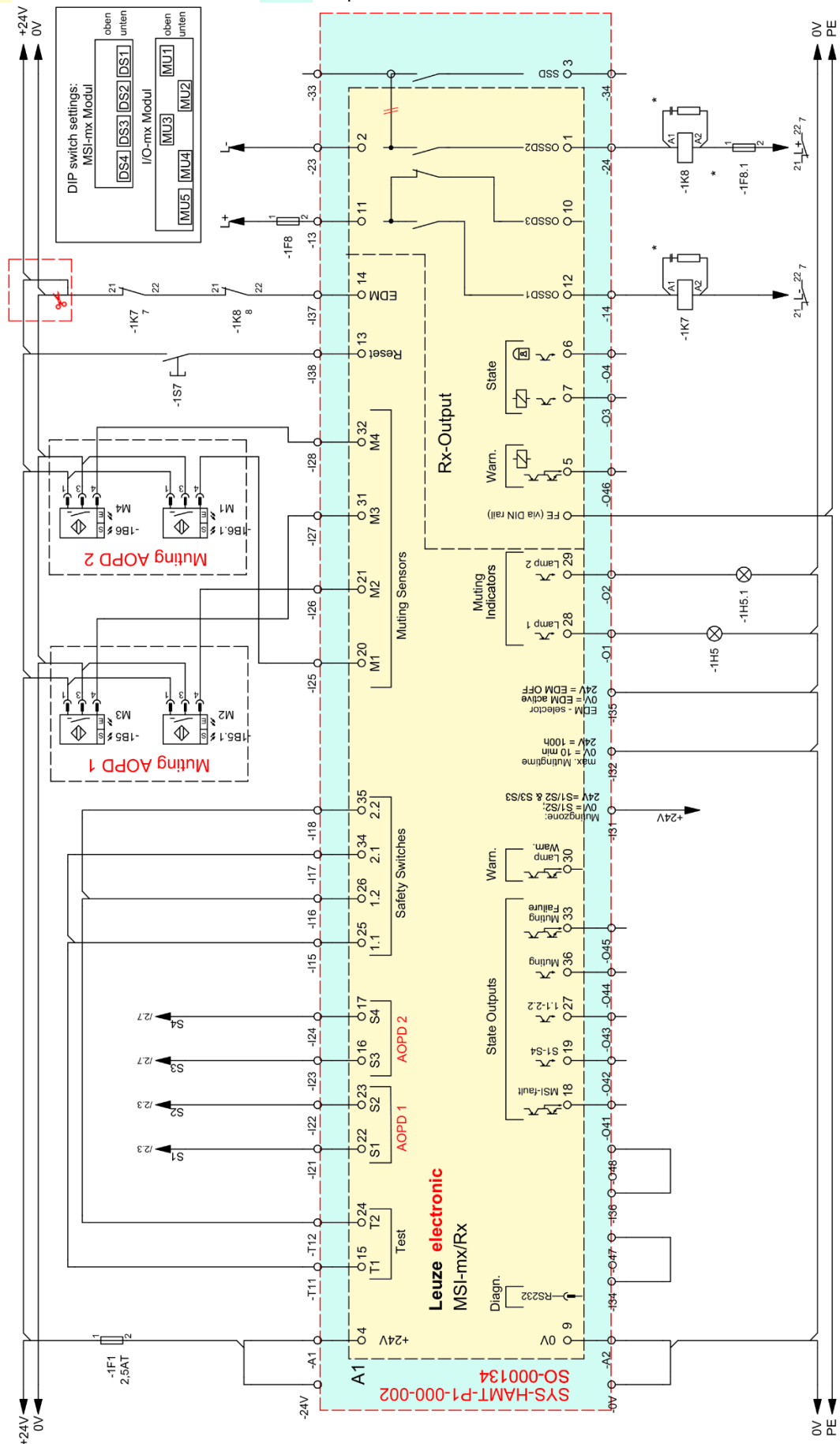
Yellow: Current MSI-mx/Rx device / Green: Replacement SYS-HAMT-P1 device



3.2.3. 2x 2-sensor "X"-muting (time-controlled) ► SO-000134

Legend:

Yellow: Current MSI-mx/Rx device / Green: Replacement SYS-HAMT-P1 device

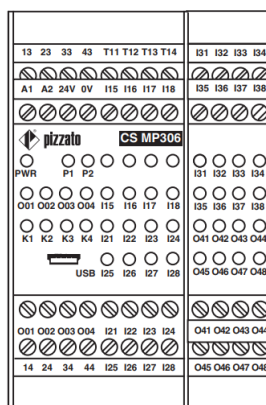


MSI-mx/Rx legacy with 2 x two sensor X - Muting

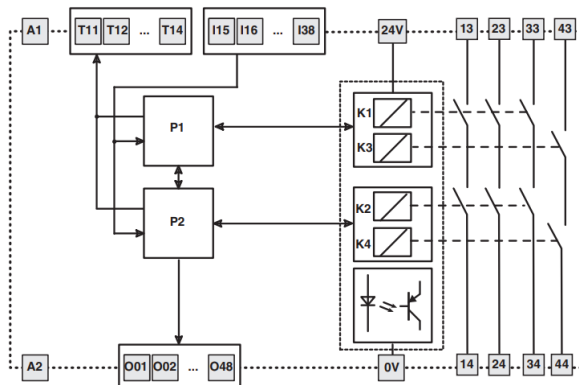
4. Pin assignment Pizzato CS MP306MO

Example of pin assignment and internal wiring diagram.

Pin assignment



Internal wiring diagram



5. Diagnostic

Signalization		
PWR LED	LEDs P1, P2	Possible fault cause
Off	Off	No power supply, incorrect connections, power wires cut, external fuses broken. Module fault
Green	Off	Normal operation
Green	Red	Non-restorable fault. Recommended action: try to restart the module, If the fault persists, send the module to be repaired.
Green	Red x 1 Blue x 1	Restorable fault: overcurrent on Tx or Ox outputs. Recommended action: disconnect the semiconductor signalling outputs (Ox) and the test outputs (Tx) to check whether an external short circuit is present.
Green	Red x 1 Blue x 2	Restorable fault: problem detected on OSx (short circuit towards earth or positive pole, or else short circuit between two OSx). Suggested action: Disconnect the safety outputs to check if there are any problems on the external connections of the OSx outputs.
Green	Red x 1 Blue x 3	Restorable fault: module temperature outside the limits. Suggested action: restore module temperature to within permissible limits.
Green	Red x 1 Blue x 4	Restorable fault: No power on 24V-0V terminals. Recommended action: Check electrical connections.
Green	Blue x N	Module entered ERROR state at the request of the application program. Error code N. Typically due to incorrect input conditions (external short circuit, status not permitted). Suggested action: disconnect the inputs to find any short circuits. Check the documentation supplied with the application program for further details.