INTERCONNECTION MODULES

JANUS MJBOX

GENERAL INFORMATION

The JANUS MJBOX modules are accessory devices designed to make the wiring of JANUS J and J TRX, JANUS M and M TRX light curtains fast and safe, and to provide the main controls necessary for their operation close to the protected gate.

In addition to the guided contacts safety relays piloted and monitored by the light curtain, terminal boards for connecting the cables, bridges and dip-switch for the configuration of the light curtain itself are also present inside.

DESCRIPTION

Externally both models have:

1. Connectors for connecting with the light curtain *(M23 for RX and M12 for TX)*.
2. Fairlead for passage of cables towards the machine for:
   - power supply;
   - connection with output contacts of the internal safety relays and static outputs of the light curtain;
   - Muting enable signals from the outside;
   - output signals which indicate the status of the safety light curtain.

The MJB1/MJB3 models also present:

1. Lighted restart button and output status / weak signal led.
2. Key selector switch for *Override* function.
3. Lamp to signal *Muting/Override* active.

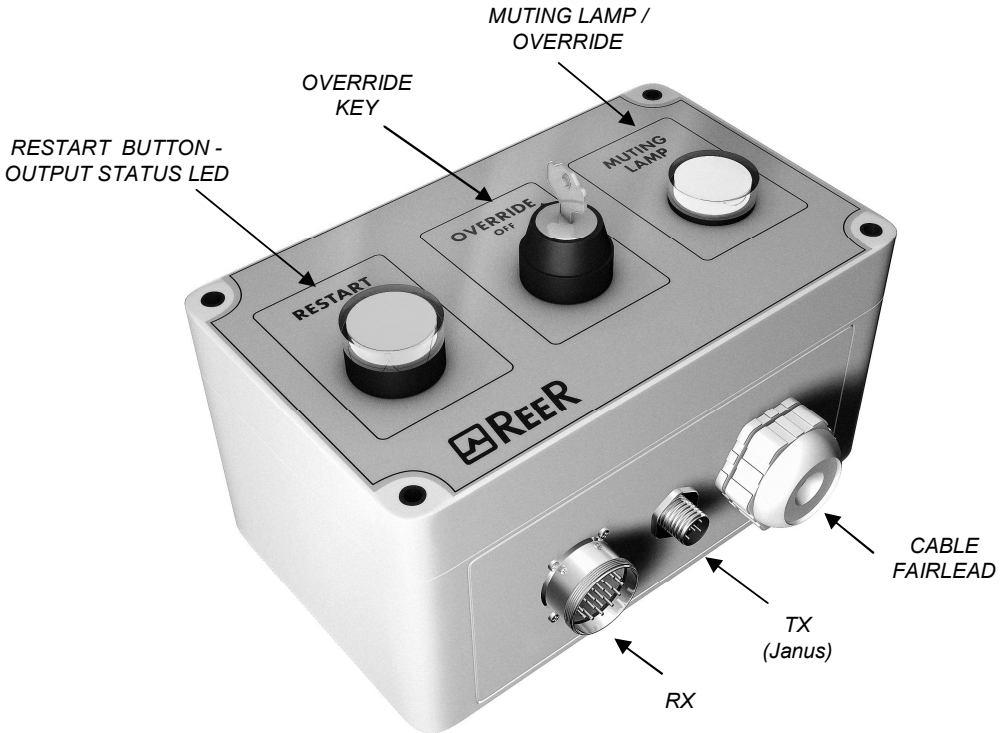


Figure 1 - MJB1/MJB3

The *MJB2 /MJB4* model has:

1. Lighted restart button and output status / weak signal led.

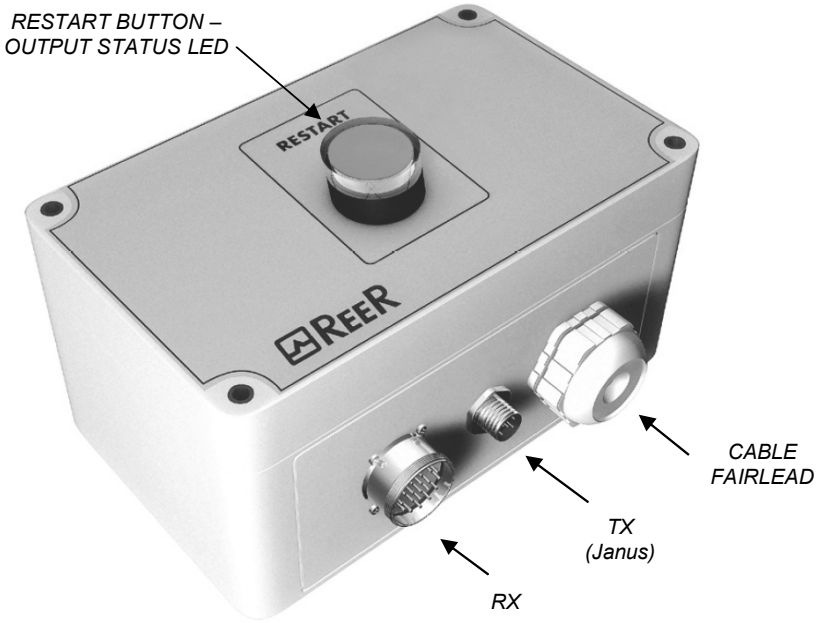


Figure 2 - MJB2/MJB4

➔ It is also possible to match the MJB2 and MJB4 models (without muting lamp and override command) with **muting** light curtains as they are fitted with the required settings.

➔ If connecting an MJB1 or MJB3 model to a JANUS J series safety barrier (without Muting function), the following connections must be disregarded: **SW1 (pins 1,2,3,4), CJ5, CJ7 (pins 7,8) and CJ9**.

➔ For the JANUS, MI, ML, MT versions use of a muting lamp (internal or external) (0.5÷5W) is obligatory for correct functioning of the light curtains.

➔ Where the risk analysis of the application requires it, the light curtain permits connection of an external lamp to signal active Muting (0.5÷5W). Perform a check of the operation of this lamp periodically verifying its turning on during the Muting or Override phase.

CONFIGURATION

With the aid of the figures of the main board of the single models, the configuration of the methods of the operating modes is described below.

This configuration is performed, following the descriptions of the following tables, setting the various jumpers, connectors and dip-switches present on the same card.

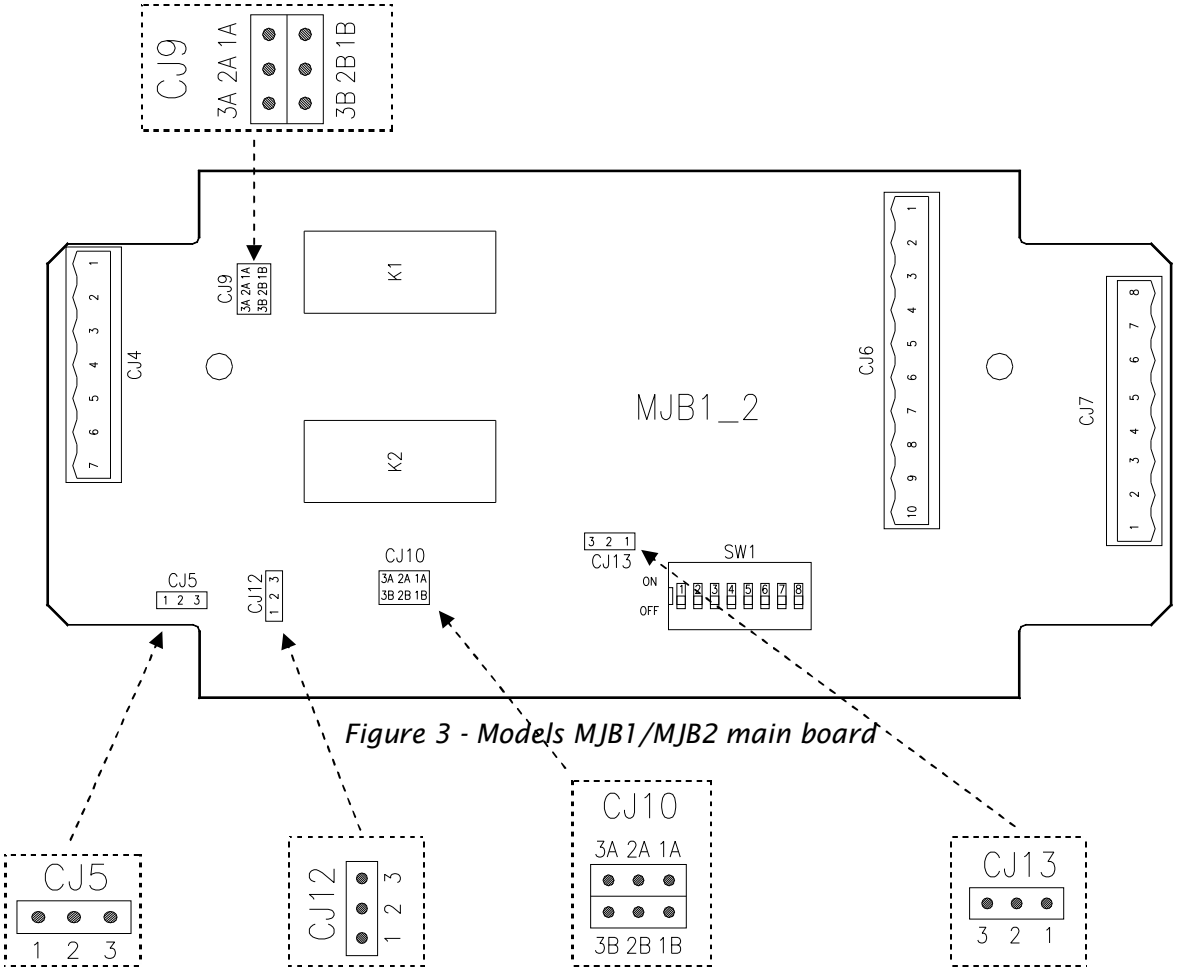


Figure 3 - Models MJB1/MJB2 main board

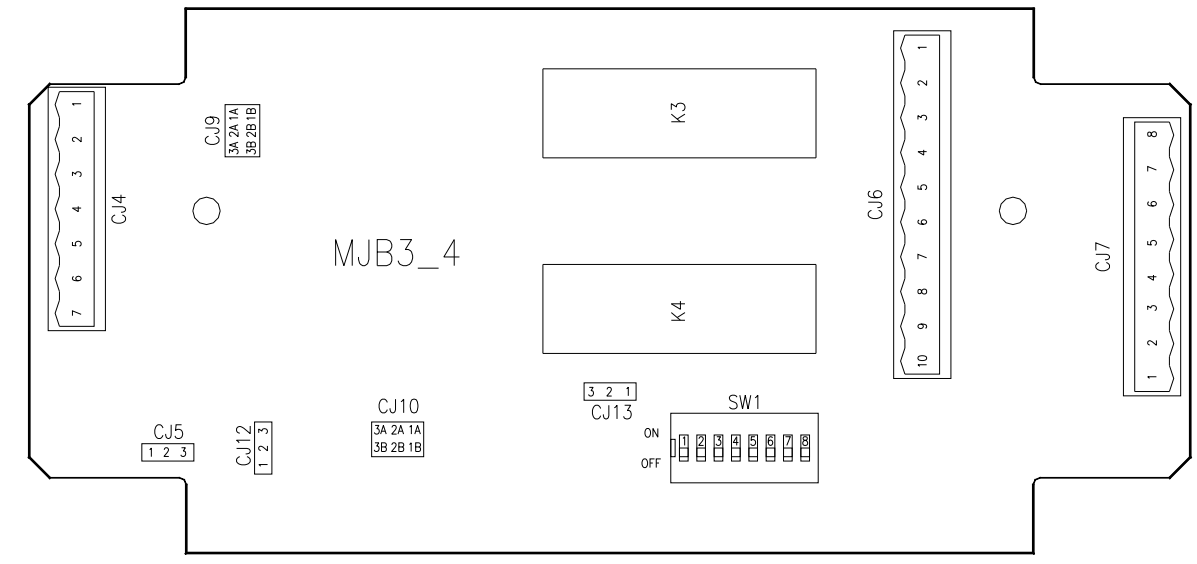
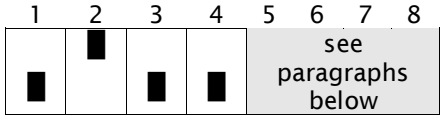
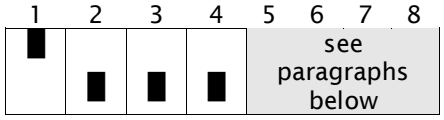
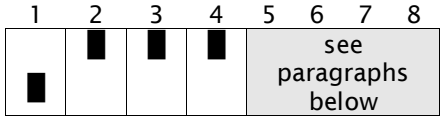
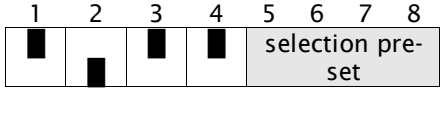
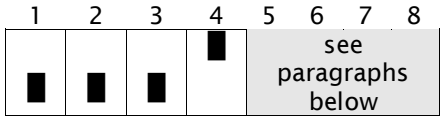
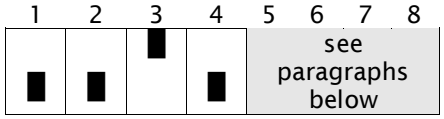
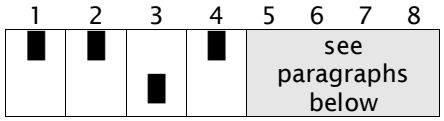
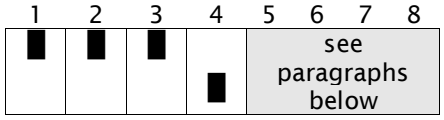
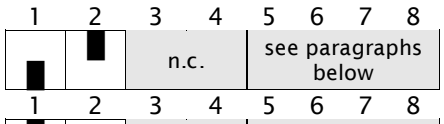
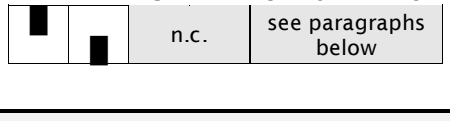


Figure 4 - Models MJB3/MJB4 main board

SELECTION OF MUTING MODE AND TIMEOUT MUTING (dip-switch SW1)

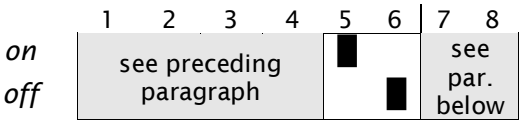
MI (2 sensors) ***MI TRX (2 sensors)***	*on* *off*		*CONCURRENT* *timeout = 30 sec*
	on *off*		*CONCURRENT* *timeout = 90 min*
MI ("L" logic) ***MI TRX ("L" logic)*** ***MM TRX (ML version)***	*on* *off*		*CONCURRENT* *timeout = 30 sec*
	on *off*		*CONCURRENT* *timeout = 90 min*
MI 4 sensors ***MT S4*** ***MI TRX 4 sensors*** ***MT TRX*** ***MM TRX (MT version)***	*on* *off*		*CONCURRENT* *timeout = 30 sec*
	on *off*		*CONCURRENT* *timeout = ∞*
MI 4 sensors ***MT S4*** ***MI TRX 4 sensors*** ***MT TRX S4*** ***MM TRX (MT version)***	*on* *off*		*Sequential* *timeout = 30 sec*
	on *off*		*Sequential* *timeout = ∞*
ML - MT - MLS2 ***ML TRX***	*on* *off*		*timeout = 30 sec*
	on *off*		*timeout = 90 min*

If a time out limit of 90min is a too short time for a particular machine cycle, the configuration without time monitoring (t=∞) can be selected. In this case alternative solutions or additional measures shall be implemented to detected the condition of a muting function permanently active caused by accumulation of faults or by the muting sensors activated all the time. For example for the application of guarding the openings of a conveyor system (palletizers) by monitoring appropriate signals generated by the transport system to determinate if and when a pallet is in the detection zone.

Perform a specific risk analysis of the application if the timeout t = ∞ is selected.

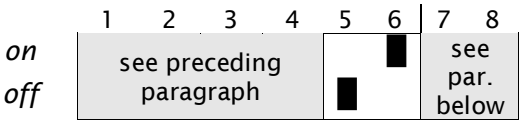
MANUAL /AUTOMATIC MODE SELECTION (dip-switch SW1)

ALL MODELS



Automatic

ALL MODELS

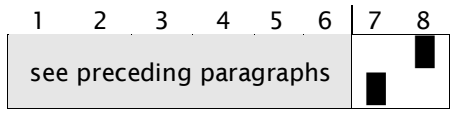


Manual

OTHER CONFIGURATIONS NOT PERMITTED

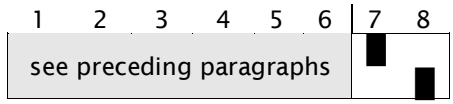
RANGE AND TEST SELECTION (dip-switch SW1)

JANUS J
JANUS MI/ML/MT



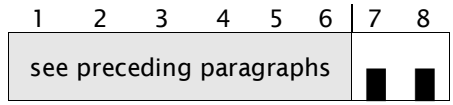
*Low range **

JANUS J
JANUS MI



*High range **

ALL MODELS
(excluding versions TRX)



TEST

OTHER CONFIGURATIONS NOT PERMITTED

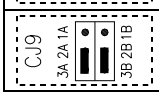
* IF TO SELECT THE RANGE OF OPERATION ***SEL_RANGE1*** AND ***SEL_RANGE2*** (PIN 1 and 6 TERMINAL BOARD CJ7) ARE USED, SET DIP 7 and 8 on **OFF-OFF** (TEST)

* ***ML/MT*** MODELS: ALLOWED ONLY THE LOW RANGE SELECTION.

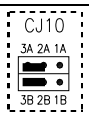
SELECTION OF INTERNAL /EXTERNAL MUTING LAMP

JUMPER	PIN	DESCRIPTION	*SELECTION PRESET*
	**1 – 2**	**External** lamp enabled	***Internal lamp enabled***
	**2 – 3**	**Internal** lamp enabled	

SELECTION TYPE OF OVERRIDE

JUMPER	PIN	DESCRIPTION	*SELECTION PRESET*
	**1A – 2A 1B – 2B**	Override **1** (with continuous action)	***Override 1 (with continuous action)***
	**2A – 3A 2B – 3B**	Override **2** (with pulse)	

SELECTION STATIC OUTPUTS/RELAYS

JUMPER	PIN	DESCRIPTION	*SELECTION PRESET*
	**1A – 2A 1B – 2B**	Static outputs	***Relay***
	**2A – 3A 2B – 3B**	Relay	

READ FEEDBACK ENABLE

JUMPER	PIN	DESCRIPTION	*SELECTION PRESET*
	**1 – 2**	Read feedback not enabled	***Read feedback enabled***
	**2 –3**	Read feedback enabled	

SELECTION FEEDBACK INTERNAL/EXTERNAL RELAYS

JUMPER	PIN	DESCRIPTION	*SELECTION PRESET*
	**1 – 2**	Feedback **external** relays	***Feedback internal relays***
	**2 – 3**	Feedback **internal** relays	

INSTALLATION AND ELECTRIC CONNECTIONS

- The JANUS MJBOX modules can be fixed to the wall, using the proper plastic brackets inserted in the holes placed on the box rear side corners. These brackets can easily rotate to reach 90°.
- The light curtain must be connected to the respective connectors M23 and M12 (Fig. 1 and 2) using the cables.
- The cables coming out from the fairlead (PG21) must be connected - depending on its utilization - to the connectors CJ6 e CJ7.

Terminal board CJ6		
CLAMP	**NAME**	**DESCRIPTION**
1	**+24Vdc**	24 ± 20%
2	**0V**	0 Vdc
3	**PE**	Earth clamp
4	**SYSTEM STATUS**	Ref to JANUS instruction manual
5	**NA2_B**	Ends of the contact normally open n. 2
6	**NA2_A**	
7	**NA1_B**	Ends of the contact normally open n. 1
8	**NA1_A**	
9	**NCB**	Ends of contacts normally closed, in parallel **(present only in models MJB3 and MJB4)**
10	**NCA**	

Terminal board CJ7		
CLAMP	**NAME**	**DESCRIPTION**
1	**SEL_RANGE1**	Range selection external control
2	**EXT LAMP**	Output of External MUTING lamp (24V; max 5W)
3	**OSSD1**	Safety static output 1
4	**OSSD2**	Safety static output 2
5	**K1_K2**	Input Feedback external relays K1/K2
6	**SEL_RANGE2**	Range selection external control
7	**MUTING_STATUS**	Output condition of muting function (only for cur. M TRX)
8	**MUTING_ENABLE**	Input of Muting enable (only for cur. M TRX)

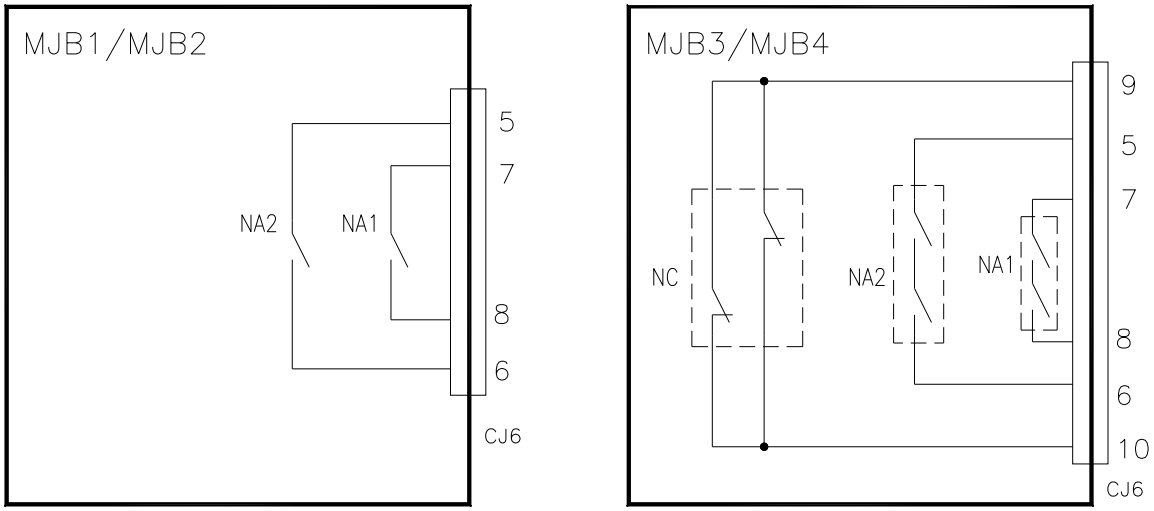


Figure 5 - Internal scheme of contacts available on safety relays of MJB1/MJB2 and MJB3/MJB4

SIGNALS

SIGNAL	**MJB1/MJB3**		**MJB2/MJB4**	
	CONDITION	**MEANING**	**CONDIZIONE**	**MEANING**
OUTPUT STATUS ***(Green)***	*ON*	*Outputs active*	*ON*	*Outputs active*
	Flashing	*Optical signal received weak ** *(Ref. to JANUS instruction manual)*	*Flashing*	*Optical signal received weak ** *(Ref to JANUS instruction manual)*
	OFF	*Light curtain occupied : outputs disabled*	*OFF*	*Light curtain occupied : outputs disabled*
MUTING OVERRIDE ***(Yellow)***	*ON*	*Muting function (or of Override) active*		
	OFF	*Normal functioning*		

* ACTIVE ONLY WITH JANUS LIGHT CURTAIN

CHARACTERISTICS OF OUTPUT RELAYS

The modules use two guided contacts safety relays *(pin 5-6 and 7-8 of CJ6 on **MJB1 and MJB2**)*, *(pin 5-6, 7-8 and 9-10 of CJ6 on **MJB3 and MJB4**)*, for the output circuit.

These relays are specified by the manufacturer for voltages and currents greater than what is indicated in the technical data; nevertheless to guarantee correct insulation and avoid damage or premature aging, protect each output line with a **3.15 A delayed fuse** and verify that the features of the load conform to the indications on the following table.

	MJB1/MJB2	MJB3/MJB4
Number of contacts	2 N.A.	2N.A. - 1N.C.*
Relay category (according to EN60947-5-1)	AC15 / DC13	
Max commutable voltage	250Vac, 24Vdc	
Min commutable voltage	10Vac/10Vdc	
Max commutable current	2A	
Min commutable current	10mA@24Vdc	
Number of commutations (life)	$\geq 50 \times 10^3$ (el) / $\geq 40 \times 10^6$ (mech)	

*** 1N.C. = DO NOT USE AS A SAFETY CONTACT**

SAFETY DATA											
FEEDBACK CONNECTION ACTIVE						FEEDBACK CONNECTION MISSING					
PFHd	SFF	MTTFd	DCavg			PFHd	SFF	MTTFd	DCavg		
8,16E-09	99,5%	71,02	99,0%	tcycle1	AC15 (6A)	4,60E-07	0,50	71,01738	0	tcycle1	AC15 (6A)
6,78E-10	99,5%	851,50	98,9%	tcycle2		4,43E-09	0,52	851,5035	0	tcycle2	
4,35E-11	99,2%	13442,07	97,6%	tcycle3		9,73E-11	0,69	13442,07	0	tcycle3	
1,52E-09	99,5%	378,64	99,0%	tcycle1	AC15 (2A)	1,86E-08	0,51	378,6359	0	tcycle1	AC15 (2A)
1,28E-10	99,4%	4523,66	98,5%	tcycle2		3,62E-10	0,58	4523,66	0	tcycle2	
9,14E-12	99,0%	67522,13	91,9%	tcycle3		1,74E-11	0,87	67522,13	0	tcycle3	

t_{cycle1}: 300s (one commutation every 5 minutes)
t_{cycle2}: 3600s (one commutation every hour)
t_{cycle3}: one commutation every day

(PFHd according to IEC61508, MTTFd and DCavg according to ISO13849-1)