

FAQ progressive code	Topics	Date
FAQ_02	Janus MJbox - Interconnection modules	13/01/2016

Questions: How does the MJBOX work? What are the commands and how the MJBOX is connected to the safety light curtains?

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 included inside. 4 models are available:



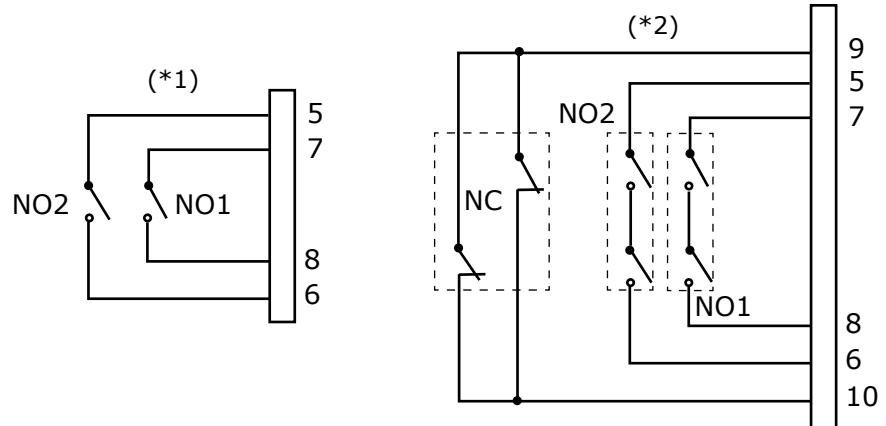
- MJB1 - 1360930**
- Safety Outputs: 2 N.O. 2A 250 VAC contacts (*1)
 - Override selector
 - Muting lamp
 - Start/Restart button with outputs status lamp
 - Connectors: M23 - 19 poles and M12 - 5 poles



- MJB3 - 1360932**
- Safety Outputs: 2 N.O. contacts + 1 N.C. contact 2A 250 VAC (*2)
 - Override selector
 - Muting lamp
 - Start/Restart button with outputs status lamp
 - Connectors: M23 - 19 poles and M12 - 5 poles

- MJB2 - 1360931**
- Safety Outputs: 2 N.O. 2A 250 VAC contacts (*1)
 - Start/Restart button with outputs status lamp
 - Connectors: M23 - 19 poles and M12 - 5 poles

- MJB4 - 1360933**
- Safety Outputs: 2 N.O. contacts + 1 N.C. contact 2A 250 VAC (*2)
 - Start/Restart button with outputs status lamp
 - Connectors: M23 - 19 poles and M12 - 5 poles



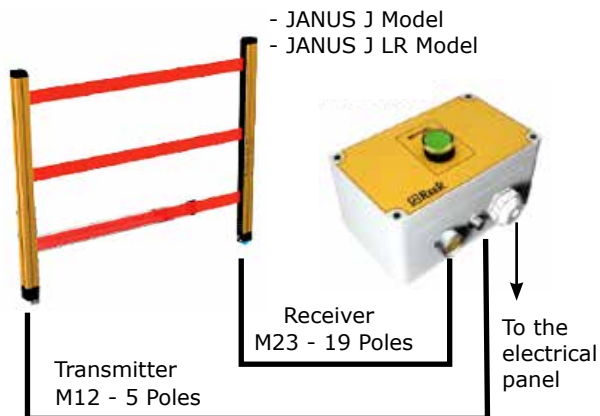
Signalling lamp

Lamp	Condition	Meaning	Model
Muting override (Yellow)	ON	Muting function active	MJB1 e MJB3
	OFF	Muting function not active	
	Blinking	Override active	
Output status (green)	ON	Outputs active - Safety light curtains free	All
	OFF	Outputs not active - Restart request	
	Blinking	Optical signal received weak	

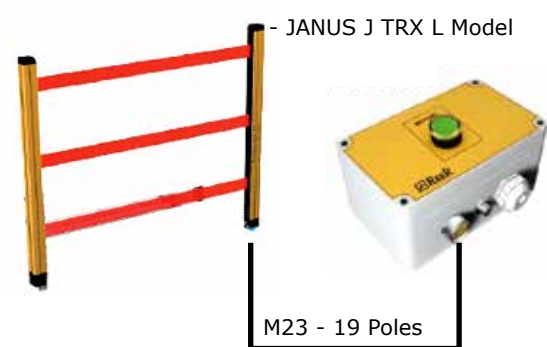
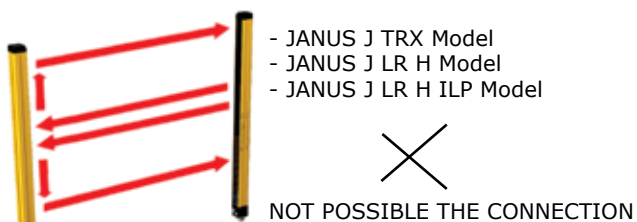
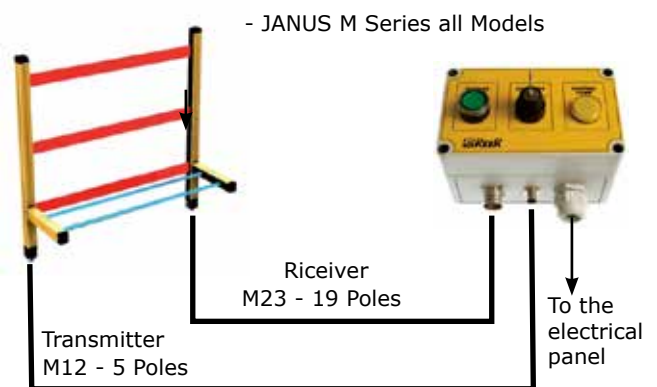
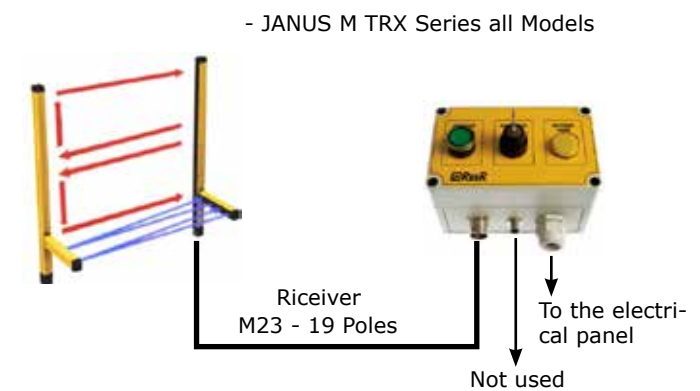
Connections

The diagram here below illustrates the possible combinations of JANUS models and modules MJBOX. The connections between the light curtain connectors and those of the module are shown.

JANUS J without muting function models



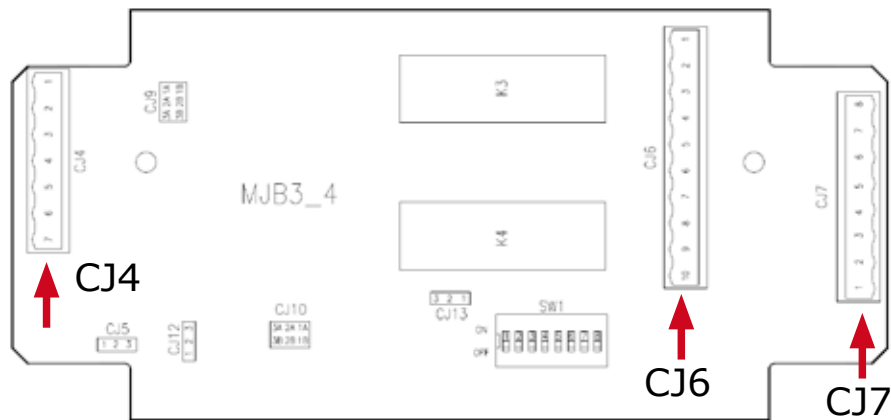
JANUS M with muting function models



The reference manuals are:

- JANUS MJBOX - cod. 8540705 MJBOX configuration + JANUS light curtains
Are showed all the DIP Switch and configuration jumpers.
- JANNUS MI TRX / MI TRX L / ML TRX / MT TRX / J TRXL - cod. 8540697 TRX models.
- JANUS - cod. 8540573 J, J LR Models and M (MI, ML, MT) Series.

For connections to the electric panel refer to the chart below:



CJ6 connector

Pin	Name	Description	Models
1	+24 Vcc	Power supply	all
2	0 Vcc	Power supply	all
3	PE	Earth clamp	all
4	System Status	Signal for Outputs status lamp - Already connected by M23	all
5	NA2_B	B Contact N.O. 2	all
6	NA2_A	A Contact N.O. 2	all
7	NA2_B	B Contact N.O. 1	all
8	NA2_A	A Contact N.O. 1	all
9	NCB	B Contact N.C.	MJB3
10	NCA	A Contact N.C.	MJB4

Morsettiera CJ7

Pin	Name	Description	Models
1	SEL. RANGE TEST 1	Range selection external control. It corresponds to pin 2 emitter. Note 1	all
2	EXT LAMP	Output of External Muting lamp (24V; max 5W)	all
3	OSSD1	Safety static output 1	all
4	OSSD2	Safety static output 2	all
5	K1_K2	Input Feedback external relays K1/K2	all
6	SEL. RANGE TEST 2	Range selection external control. It corresponds to pin 4 emitter. Note 1	all
7	MUTING STATUS	Output condition of muting function. Note 2	all
8	MUTING ENABLE	Input of Muting enable. Note 2	all

Note 1 Only for J, J LR e MI Models - For MT and ML models it enable or disable the external TEST command. See JANUS cod. 8540573 manual and the section "Function test" on the following page.

Note 2 Only for M TRX Models. See JANUS M TRX cod. 854097 manual.

Commands and functions



Restart button

It allows to restore the OSSD 1 and OSSD2 light curtain after an intervention of the same light curtain. The minimum duration of the RESTART command is 100ms.

The safety outputs OSSD1 and OSSD2 are activated (+24VDC) only if the protected area is free and after the reception of the RESTART signal.

The green lamp on the Restart button indicates the outputs status:

- Light curtain occupied outputs disabled --> **OFF**
- Outputs active --> **ON**
- Optical signal received weak --> **Blinking** (only for light curtain models that provide this indication). See "**Outputs Status green lamp on restart button**".

Override selector

The selector activates the muting override function configured in one of two modes:

- Override with continuous action command. In this case it is necessary to keep the selector key in ON position for the duration of the override request.
- Override with pulse command. In this case, just turn the key in ON position and then back to position OFF.

Muting/override lamp

The muting/override lamp indicates the status of the "**muting override**" function described in the next section:

- Muting active --> **ON**.
- Muting not active --> **OFF**.
- Override active: --> **Blinking**.

Check operation of the lamp periodically controls if it's on/flash together with the light curtain efficiency.

Outputs status green lamp on restart button

It is available on terminal CJ6 (pin 4) and it is a signal that detects two separate information:

1. Status of the OSSD outputs of the light curtain.
2. Weak signal arriving from the Emitter - For JANUS TRX model this signal is not used.

The output signal will be set to one (24 Vdc) or zero (according to the status of the OSSD)

- 0 VDC --> OSSD outputs de-activated (occupied light curtain or waiting for restart) - Lamp OFF.
- 24 VD --> OSSD outputs active (free light curtain) - Lamp ON.
- For models that also provide an indication of weak signal (all except the models TRX), the output signal will be cyclic and the lamp blinking when the signal of the emitter is weak.

Muting override function

The OVERRIDE function must be used when the machine stops due to incorrect Muting activation sequences with the material obstructing the guarded opening.

In this situation, the OSSD outputs are not active as the light curtain and/or at least one Muting sensor is occupied. In this condition the OVERRIDE request led blinks.

Acting on the MJBOX Override selector activates the OSSD outputs making it possible to remove the material that is obstructing the opening concerned.

The operator will use the Override mode previously selected (**Jumpers CJ9**):

- **Override with continuous action command** (juper between pins 1A - 2A and between pins 1B - 2B)
This function is activated using a 2-way key selector with spring return. When this function is activated driving pins 16 and 17 of the TX element to +24VDC at the same time.

PIN 16	PIN 17	CONDITION
0	0	Normal operation
24VDC	24VDC	OVERRIDE request

The maximum override duration is 15 minutes; it can be stopped for two different causes:

1. When the selector is released or if the 15 minutes has been elapsed, override ends, de-activating the OSSD outputs, turning off the muting lamp and showing normal condition on the display. A new override condition can be started, releasing and rearming the selector.
 2. Once the opening has been cleared and the sensors are free again, override ends and GUARD condition (light curtain in normal operation) is activated without necessity of further commands.
- **Override with pulse command** (juper between pins 2A - 3A and between pins 2B - 3B)
This function is activated inverting (maximum delay = 400ms) the condition of pin 16 and 17 of the TX element using a 2-way key selector with spring return (switch) . During the override the 16 and 17 are not controlled.

PIN 16	PIN 17	CONDITION
0	24VDC	Normal operation
24VDC	0	OVERRIDE request

The override condition can last a maximum of 15 minutes (repeatable). The function can only be re-started by rotating the selector (subject to the following conditions) :

1. Maximum total OVERRIDE time (after n consecutive requests) = 60 min
2. Maximum number of consecutive requests for OVERRIDE = 30.

The override condition ends when the light curtains and sensors are cleared (entrance clear) and the GUARD condition is re-enabled (light curtains fully operational) without sending any further commands.

The timer (point 1) and counter (point 2) are reset when one of the following conditions occurs:

- A correct muting sequence.
- A system reset (switched off and then turned on).

Throughout the entire phase during which the OVERRIDE function is active, the OVERRIDE/MUTING light is ON. Check efficiency of this light periodically (during the Muting or Override phases).

Warning!! The Override with pulse command automatically activates the outputs of the light curtain until both the light curtain and the muting sensors are free of obstacles again. During this period, the light curtain is unable to protect access to the guarded opening. Therefore, all operations must be carried out under the strict supervision of expert personnel.

Restart function

Manual or automatic restart operating mode can be set through connection of pins 13 and 14 of the M23 connector.

Using the form MJB0X implicitly choosing the manual mode. For reset the light curtain outputs is necessary to press the RESTART.

In MANUAL functioning, the two static outputs OSSD1 and OSSD2 are active only with the danger area clear and after the light curtain has received a correct RESTART signal.

This command must be sent on pin 14 of the TX element and is active with a 0VDC ---> +24VDC transition.

The minimum duration of the RESTART command must be 100ms.

Nota: Use of manual mode (start/restart interlock activated) is compulsory if the safety device controls an opening to protect a danger area and a person, after passing through the opening, may remain in the danger area without being detected (use as 'trip device' according to IEC 61496). Failure to comply with this rule may result in very serious hazards for the persons exposed.

The Restart control must be installed outside the danger area in a position where the danger area and the entire work area concerned are clearly visible. It must not be possible to reach the control from inside the danger area.

TEST function ("J"- "LR"- "MI" models)

By means of the test function, which simulates occupation of the protected area, it is possible to verify the operation of the entire system by means of an external supervisor (e.g. PLC, control module, etc.). The JANUS light curtains system features an automatic self-diagnosis function that enables it to detect response time malfunctions (this time is declared for each model).

The TEST function is available should the user wish to check equipment connected downstream of the light curtain (without physically entering the protected area). By means of this function the OSSDs can be switched from ON to OFF as long as the function remains active.

The pins that allow you to select this command are the same as defining the range (pins 1 and 6 of the CJ7 terminal block)

PIN 1	PIN 6	DESCRIPTION
+24VDC	0 VDC	Low Range
0 VDC	+24 VDC	High Range
0 VDC	0 VDC	TEST EMITTER