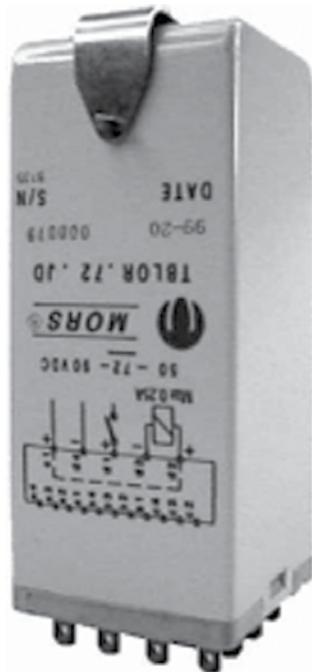


# TBL AO relay - Electronic timer, delay-on pull-in

## Datasheet



### Description

The electronic timer TBL AO is a delay-on pull-in timing module. It offers an extended range duration (0.25 seconds to 63.75 min) and controls an external load from a common source. The time delay with programmable lag is specified by external connections.

The plug-in design offers secure locking feature for maximum ease of maintenance (no wires need to be disconnected or other hardware removed for relay inspection or replacement). The resistance to impact and vibration is conform to standards in force for Railway Transported Equipment.

Positive mechanical keying of relay to socket is built into relay and socket during manufacture and terminal identifications are clearly marked on identification plate that is permanently attached to the relay.

The TBL AO relay is pluggable in the following sockets: EA 102 B, EA 102 BF, EA 103 BF, EA 104 BF, EA 105 BF, EA 112 BF.

### Application

The TBL AO electronic timing module is designed for applications with a programmable timing function used for example in HVAC and lighting.

#### Features

- Delay-on pull-in timing module
- Extended time delay range
- Delay range 0.25 s...63.75 min
- Time delay programmable by external connections with additive time combination
- Plug-in design with secure locking feature for maximum ease of maintenance
- -40 °C...+85 °C operating temperature

#### Benefits

- Proven reliable
- Long life cycle
- Accurate timing selection finger safe
- Easy to maintain and replace
- Low life cycle cost
- No maintenance

#### Railway compliancy

- CF 62-003 European railway standard
- NF F 16-101/102 Fire behaviour - Railway rolling stock
- EN 50155 Railway application - Electronic equipment used on rolling stock
- IEC 61373 Railway application - shock and vibration tests



# TBL AO relay

## Technical specifications



### Functional and connection diagrams

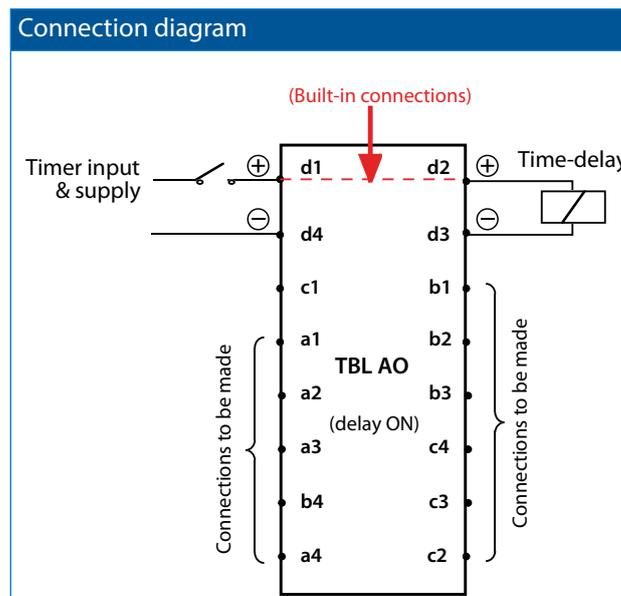
Timing diagram	Relay pin correspondence
<p><b>Type AO (delay on pull-in)</b> (also called delay on Energization, delay ON or delay on make)</p> <p><b>Operation:</b> With power supply ON and connected to timer input terminals d1-d4, when switch is closed, the time interval programmed by wiring from tables below begins. At end of interval, an output signal appears across terminals d2-d3 to actuate load.</p>	<p><b>Relay pin correspondence</b></p> <p>1 2 3 4 a a b b c c d d (rear view of relay shown)</p> <p>Example: KE keying</p>

Connections		Function
d1		timer input (+)
d4		timer input and supply (-)
d2		timer delayed load output (+)
d3		timer delayed load output (-)
c1		not connected

**Time Delay Input Polarity:**  
d1 can be connected to - (d2 becomes -)

Time delay	Short 0,25 to 63,75 s	Long 0,25 to 63,75 min
Connections	a1 - b1	-
b3 - a2	0,25 s	0,25 min
b3 - a3	0,5 s	0,5 min
b3 - a4	1 s	1 min
b3 - b4	2 s	2 min
b3 - c4	4 s	4 min
b3 - c3	8 s	8 min
b3 - c2	16 s	16 min
b3 - b2	32 s	32 min

**Note:** b3 - x connections are additives.  
Example: To make 5 min delay, connect b3 - a4 - c4



# TBL AO relay

## Technical specifications

### Timing characteristics

Time function	Delay-on pull-in
Total time delay range	0.25 s...63.75 min
Time delay adjustment	Fixed after connecting
Adjustment / repeatability accuract	< 12.5% / 1% (adjustment with power off)

### Input data

Keying	U <sub>nom</sub> (VDC)	U <sub>operating</sub> (VDC)
KE	24	17 / 33
PW	48	35 / 60
HD	72	50 / 90
SW	110	77 / 138

### Electrical characteristics

Operating voltage	24 VDC...110 VDC
Load voltage drop	< 3 V
Operating current	< 30 mA
Maximum load current	0.25 A
Dielectric strength	2000 VAC, 1 min
Insulation resistance	≥ 1000 MΩ at 500 VDC



# TBL AO relay

## Technical specifications

### Mechanical & environmental characteristics

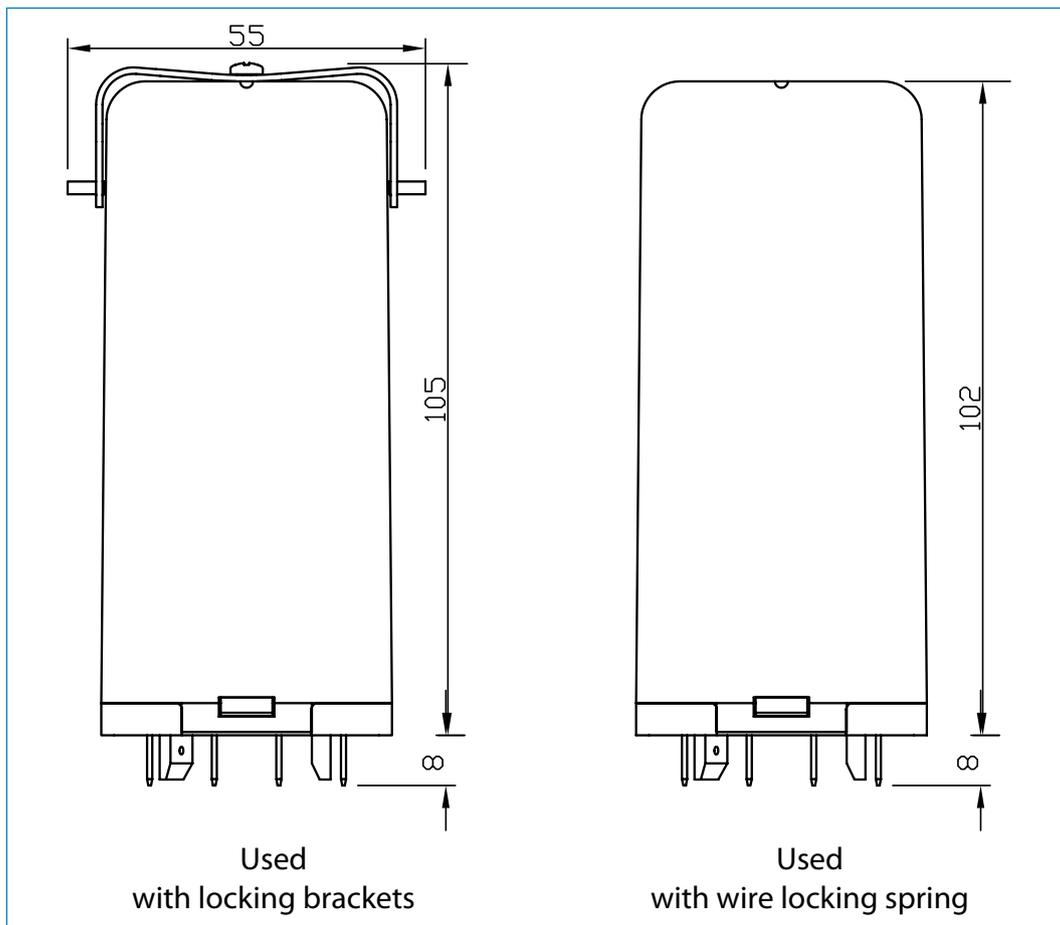
Vibration	NF F 62-002 The tests are conducted in the X, Y , Z planes at frequency between 10 & 150 cycles (sinusoidal) at 2 g IEC 61373
Shock	NF F 62-002 Tests are applied in both directions in the X, Y & Z planes. Then successive shocks are administered consisting of the positive component of sinusoidal with a value of 30 g, 18 ms IEC 61373 Other vibration and shock tests can be performed on request.
Mechanical life	MTBF of 117.000 h
Weight	199 g (7 ounces)
Temperature	-40 °C...+85 °C
Humidity	93% RH, 40° C for 4 days
Salt mist	5% NaCl, 35° C for 4 days
Protection	IP40 (relay on socket)
Fire & smoke	Materials: Polycarbonate (cover) / polyester melamine (base) Note: These materials have been tested for fire propagation and smoke emission according standards NF F 16-101, NF F 16-102. And have been approved for use on the English/French train channel shuttle.



# TBL AO relay

## Technical specifications

### Dimensions (mm)

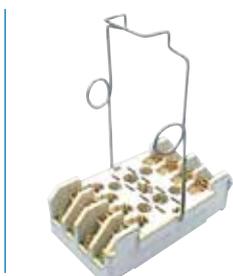


# TBL AO relay

## Mounting possibilities / sockets



EA 102 B



EA 103 BF



EA 104 B



EA 112 BF

### Panel/flush mounting

EA 102 B	Locking bracket (905843), rear connection, double Faston 5 mm
EA 102 BF	Wire locking spring (926853), rear connection, single Faston 5 mm
EA 104 B	Locking bracket (905843), rear connection, single Faston 5 x 0.8 mm
EA 104 BF	Wire locking spring (926853), rear connection, single Faston 5 x 0.8mm
EA 112 BF	Wire locking spring (926853), rear connection, crimp contact

### Surface/wall mounting

EA 103 BF*	Wire locking spring (926853), front connection, M3 screw 6.5 mm ring terminals (2,5 mm <sup>2</sup> )
EA 105 BF*	Wire locking spring (926853), front connection, single Faston 5 mm

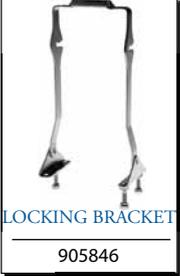
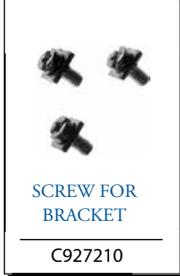
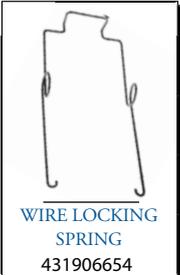
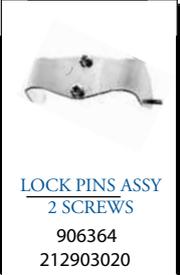
\* Mounting possibility on 35 mm rail EN 50022 by adding suffix D to the part number (see socket datasheet)

Note: Keying of relay to socket can be specified by adding the keying letters in the part number. See all details in the related socket datasheet.

# TBL AO relay

## Spare parts

### Spare parts - order part numbers

(1)  LOCKING BRACKET 905846	(1)  SCREW FOR BRACKET C927210	(1)  METAL STRAP (2) P928060	(1)  METAL STRAP (4) P928061
(1)  WIRE LOCKING SPRING 431906654	(1)  ROUND PLASTIC PLUGS 414928005	(2)  HEX. PLASTIC KEYS 414905678	(3)  LOCK PINS ASSY 2 SCREWS 906364 212903020

(1) Parts only for socket  
 (2) Parts for relay and socket  
 (3) Parts only for relay



# TBL AO relay

## Instructions

### Installation

Install socket and connect wiring correctly according identification to terminals. Plug relay into socket. Reverse installation into socket not possible due to mechanical blocking by snap-lock.

Don't reverse polarity of coil connection. Relays can be mounted (tightly) next to each other and in any attitude.

**Warning!** Never use silicon near by relays

### Operation

Before operating always apply voltage to coil to check correct operation.

Long term storage may corrode the silver on the relay pins. Just by plugging the relay into the socket, the female bifurcated receivers will automatically clean the corrosion on the pins and guarantee a good connection.

Do not use the relay in places with flammable gas as the arc generated from switching could ignite gasses.

### Maintenance

Correct operation of relay can easily be checked as transparent cover gives good visibility on the moving contacts. When the relay doesn't seem to operate correct, please check presence of coil voltage. Use a multimeter. If LED is used, coil presence should be indicated. If coil voltage is present, but the relay doesn't work, a short circuit of suppression diode is possible (The coil connection was reversed). If relay doesn't work after inspection, please replace relay unit by a similar model. Send defective relay back to manufacturer. Normal wear and tear excluded.



# TBL AO relay

## Ordering scheme

Configuration:

TBL	AO	24	KE	F	1
1. Relay model	2. Delay mode	3. Nominal voltage	4. Keying	5. Cover type	6. Language report

This example represents a **TBL AO 24 KE F 1**.

**Description:** TBL AO relay,  $U_{nom}$ : 24 VDC, keying KE, relay cover for wire locking spring, test report in English

### 1. Relay model

**TBL**

### 2. Delay model

AO Time delay on pull in

### 3 & 4. Nominal voltage and keying

24 KE	24 VDC
48 PW	48 VDC
72 HD	72 VDC
125 SW	125 VDC

### 5. Relay cover type

–	Relay cover with lock pins
F	Relay cover for wire locking spring

### 6. Language on test report

–	French
1	English
2	Spanish





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