# TCAL relay - Electronic timer, flasher

## Datasheet

## Description

The electronic timer TCAL is a flashing module. It offers an extended pulse duration range (0.25 seconds to 63.75 minutes) and controls an external load from a common source. The time delay with programmable lag is specified by externalconnections.

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 TCAL relays is pluggable in the following sockets: EA 102 A, EA 102 AF, EA 103 AF, EA 104 A, EA 104 AF, EA 105 AF, EA 112 AF

## Application

The TCAL electronic timing module is designed for applications with a programmable timing function.

### Features

- Flashing module (symmetrical)
- Extended pulse duration range with additive time combination
- Pulse duration from 0.25 s ...63.75 min
- Time delay programmable by external connections
- Plug-in design with secure locking feature for maximum ease of maintenance

### Benefits

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

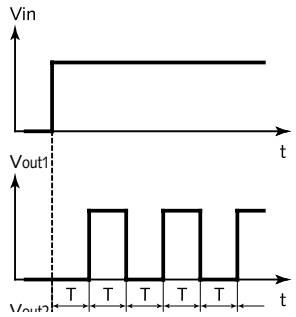
### Railway compliancy

- CF 62-003 European railway standard
- NF F 16-101/102 Fire behaviour - Railway rolling stock

# TCAL relay
## Technical specifications

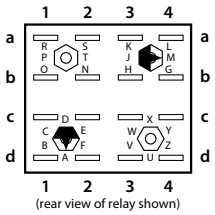
## Functional and connection diagrams

### Timing diagram




### Relay pin correspondence

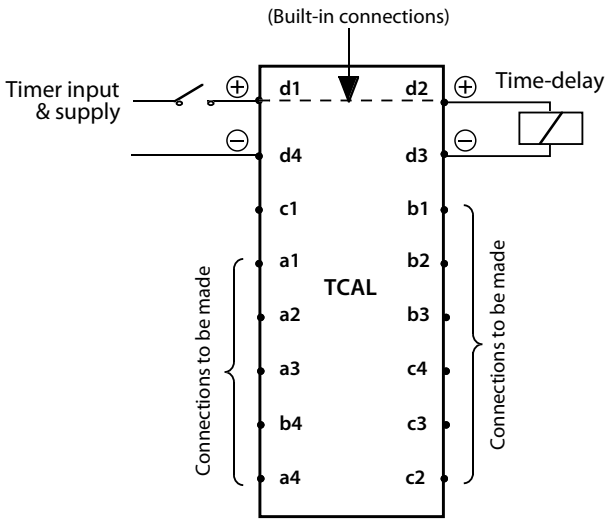
**Relay pin correspondence**




(rear view of relay shown)

Example: **AM keying**

### Connection diagram




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

| Flashing time | 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 pulse, connect b3 - a4 - c4

# TCAL relay
## Technical specifications

### Timing specifications

| | |
|---|---|
| Time function | Flashing (symetrical) |
| Total pulse duration range | 0.25 s...63.75 min |
| Pulse duration adjustment | Fixed after connecting the terminals |
| Adjustment / repeatability accuracy | ± 2% / ± 2% |

### Input data

| Keying | Unom (VDC) | Uoperating (VDC) |
|---|---|---|
| AM | 24 | 16 / 30 |
| FM | 36 | 25 / 45 |
| DM | 48 | 33 / 60 |
| BM | 72 | 50 / 90 |
| EM | 110 | 77 / 138 |

### Electrical characteristics

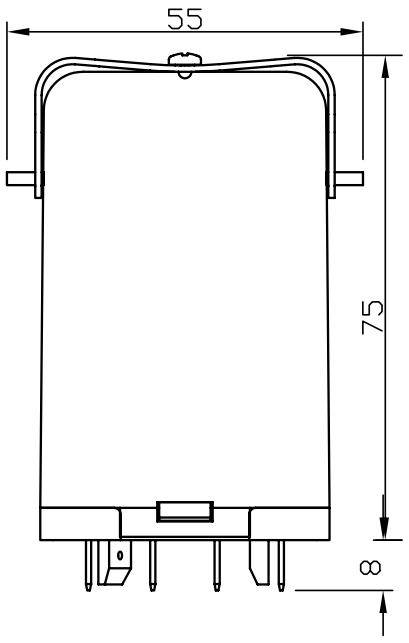
| | |
|---|---|
| Operating voltage | 24 VDC...110 VDC |
| Load voltage drop | < 0.1 V |
| Operating current | < 20 mA |
| Maximum load current | 0.8 A |
| Dielectric strength | 2000 VAC, 1 min |
| Insulation resistance | ≥ 1000 MΩ at 500 VDC |

# TCAL relay
# Technical specifications

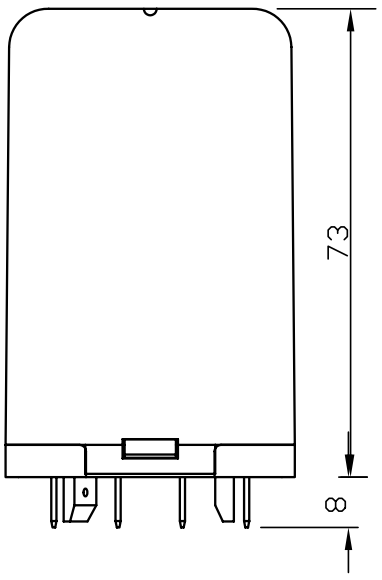
## Mechanical and environmental specifications

| | |
|---|---|
| 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 |
| 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<br>Other vibration and shock tests can be performed on request |
| Mechanical life | MTBF > 500.000 hours |
| Weight | 79.5 g (2.8 ounces) |
| Temperature | -40 °C...+80 °C |
| Humidity | 93% RH, 40° C for 4 days |
| Salt mist | 5% NaCl, 35° C for 4 days |
| Protection | IP40 (electronic timer on socket) |
| Fire & smoke | Materials: Polycarbonate (cover) / polyester melamine (base)<br>Note: These materials have been tested for fire propagation and smoke emission according standards NF F 16-101, NF F 16-102 |

## Dimensions (mm)




Used
with locking brackets




Used
with wire locking spring

# TCAL relay
## Mounting possiblities / sockets

EA 102 A

EA 103 AF

EA 104 A

EA 112 AF

### Panel/flush mounting

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

### Surface/wall mounting

| | |
|---|---|
| EA 103 AF* | Wire locking spring (926853), front connection, M3 screw 6.5 mm ring terminals (2.5 $mm^2$) |
| EA 105 AF* | Wire locking spring (926853), front connection, single Faston 5 mm (3/16”) |

* 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.

# TCAL 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..
**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.

# TCAL relay
## Ordering scheme

Configuration:

| TCAL | 24 | AM | F | 1 |
|---|---|---|---|---|
| 1. Relay model | 2. Nominal voltage | 3. Keying | 4. Cover type | 5. Language (test report) |

This example represents a **TCAL 24 AM F 1**
**Description**: TCAL relay, $U_{nom}$: 24 VDC, keying AM, relay cover for wire locking spring, test report in English.

### 1. Relay model

| |
|---|
| **TCAL** |

### 2 & 3. Nominal voltage and keying

| | |
|---|---|
| **24 AM** | 24 VDC |
| **36 FM** | 36 VDC |
| **48 DM** | 48 VDC |
| **72 BM** | 72 VDC |
| **110 EM** | 110 VDC |

### 4. Relay cover type

| | |
|---|---|
| – | Relay cover with lock pins |
| **F** | Relay cover for wire locking spring |

### 5. Language on test report

| | |
|---|---|
| – | French |
| **1** | English |
| **2** | Spanish |

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