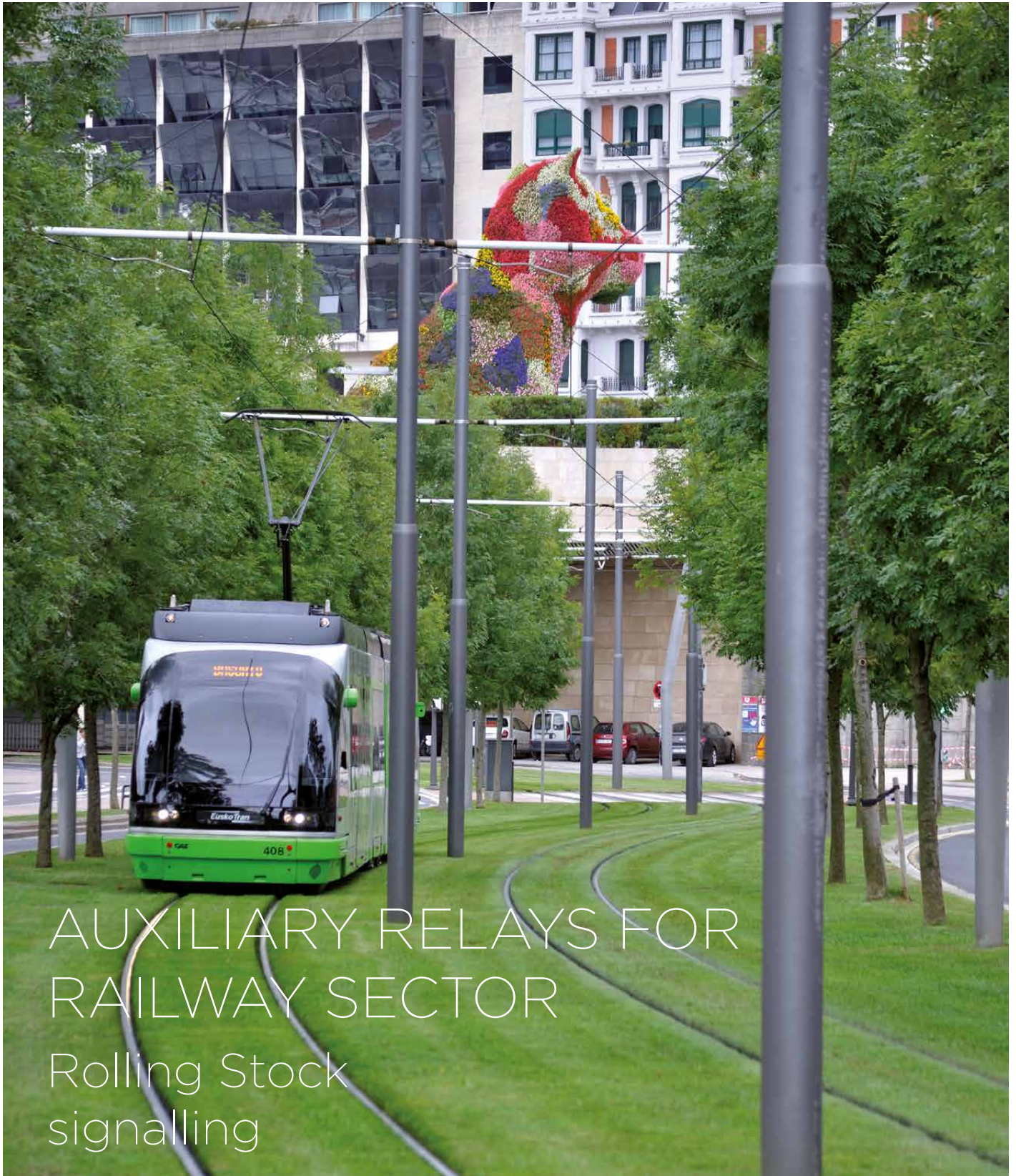




# AUXILIARY RELAYS FOR RAILWAY SECTOR

Rolling Stock  
signalling

This document may be subject to changes. Contact ARTECHE to confirm the characteristics and availability of the products described here.

# Moving together

An abstract graphic consisting of numerous thin, white, curved lines that sweep across the bottom half of the page. The lines originate from the left side and curve towards the right, creating a sense of movement and flow. The background is a solid, vibrant blue.

# INDEX

- 4.     › Answers for railway applications
- 5.     › General characteristics
- 6.     › Technical standards
- 7.     › Range of products
- 8.     › Railway applications
- 10.    › Instantaneous relays
- 12.    › Time-Lag relays
- 14.    › Latching relays
- 16.    › Contactors
- 18.    › Impulse relay
- 19.    › Breaking capacity
- 24.    › Pick-up voltage/release voltage-temperature charts
- 27.    › Model selection
- 29.    › Dimensions and panel mounting cut-off

# ANSWERS FOR RAILWAY APPLICATIONS

ARTECHE auxiliary relays guarantee the best features and complete security even in the hardest working environment.

The FF range has been designed to fulfil the most demanding requirements in the railway industry in regards to low duty loads, fire and smoke, etc.

Their design, durability and quality make them suitable for high responsibility controls in the railway sector, highlighting:

## ROLLING STOCK:

- › Boarding doors locking.
- › Brake circuit command.
- › Security loop.
- › Pantograph control.
- › Lighting and air conditioned systems operation.
- › Traction system.
- › Brake systems.



## INTERLOCKING AND SIGNALLING:

Interface between infrastructure and rolling stock:

- › ASFA systems.
- › RTMC systems.
- › RTMS systems.
- › CBTC systems.
- › ETCS systems.
- › ATO/ATP/ATS/APR... systems



# GENERAL CHARACTERISTICS

The main features of ARTECHE's auxiliary relays are the following:

- › Security contacts, WELD NO TRANSFER (EN 50205 Standard).
- › NO WELD contacts (NF F 70-031 Standard).
- › Capable to withstand vibrations and seismic conditions (EN 61373 Standard).
- › Capable to operate under low duty loads, activate digital inputs, and operate without any load.
- › Security applications: they can be used in applications up to SIL 4.
- › Wide range of auxiliary voltage levels (Vdc and Vac).
- › Sturdy design.
- › Self-cleaning contacts.
- › Designed to allow continuous operation even in high ambient temperature, within the whole voltage range.
- › High level of electrical insulation between input and output circuits.
- › High degree of protection (IP40), with transparent cover, making them suitable for use in salty and tropical atmospheres.
- › Capable to work under ambients with relative humidity around 100%.
- › Simplicity of installation (plug-in relays in a wide range of sockets with different installation configurations).
- › No need of maintenance after installation.



In addition, the different number of alternatives that are offered when the equipment is selected, both technically (increase of the breaking capacity by serial contacts, possibility of adding different options to the relay) and in the assembly method (front, rear or flush mounted sockets, with screws or fastons) must be considered.

# TECHNICAL STANDARDS

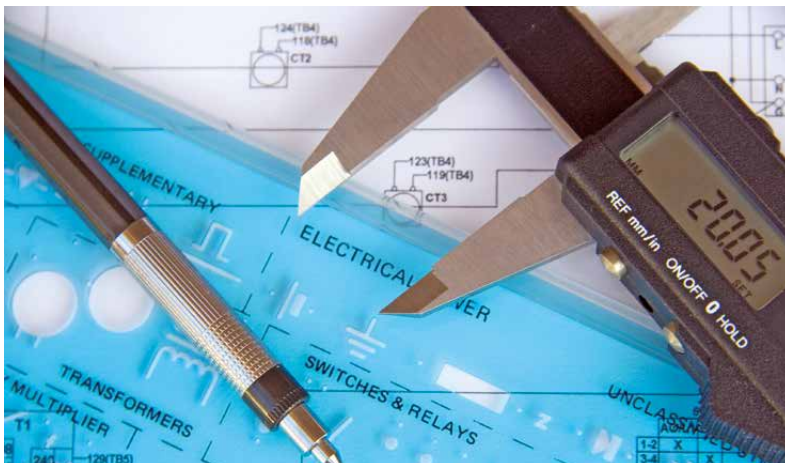
## RAILWAY APPLICABLE STANDARDS

- › **EN 60077 Series.** Rolling stock equipment.
  - Part 1: General conditions in service and general terms.
  - Part 2: Electrotechnical components.
- › **EN 50155** (IEC 60571 equivalent). Railway applications - Electronic equipment used on rolling stock.
- › **IEC 61373.** Railway applications - Shock and vibration tests.
- › **NF F 16-101 y NF F 16-102.** Rolling stock fire behaviour.
- › **EN 45545-2.** Railway applications - Fire behavior of materials and components.
- › **RIA 12.** General specification for protection of traction and rolling stock electronic equipment from transients and surges in DC control systems.
- › **EN 50121-3-2:2006.** Electromagnetic compatibility.
- › **EN 50205.** Relays with forcibly mechanically guided contacts. WELD NO TRANSFER
- › **NF F 70-031.** Contact weld resistance tests. NO WELD CONTACTS
- › **UIC 736R:2004.** Signalling relays.

## GENERAL STANDARDS

In addition to the specific applicable standards, ARTECHE auxiliary relays are designed based on the fulfilment of the following standards:

- › **IEC 61810:** Electromechanical all-or-nothing relays.
- › **IEC 60255:** Electrical relays. Measuring relays and protection equipment.
- › **IEC 61812:** Specified time relays for industrial use.
- › **IEC 60947:** Low-voltage switchgear and controlgear.
- › **IEC 61000:** Electromagnetic compatibility.



E322124

**UL Recognized Component Marks for USA and Canada:** The combined UL signs for the USA and Canada are recognized by the authorities of both countries. All auxiliary relays identified with this mark meet the requirements of both countries.

# RANGE OF PRODUCTS

## INSTANTANEOUS RELAYS

Thanks to an exhaustive control process, the FF range can assure a correct performance of the contacts with low duty loads or even with no load.

These instantaneous relays can be manufactured with different options: front led, mechanical indication of the contacts position, trip flag and push to test button (see model selection table in page 27).

### Instantaneous relays

ARTECHE's auxiliary relays are designed to work properly under frequent vibration and shock applications, as in the case of railway sector.

They comply with the extended voltage range (+25 / -30 %).

The sturdy design of our equipment, with a higher appropriate pressure between contacts, allows them to withstand vibrations without penalizing the good performance of the relays.

### Instantaneous relays with coil overvoltage protection

In applications with overvoltage, where drop-out time is not important, it is recommended to use a diode. Otherwise, a varistor is more suitable.

These elements are aimed to discharge the energy of the coil when the relay is no longer energized.

These relays are suitable when the customer wishes to protect the contact of the equipment which commands the operation of our relay, providing a longer durability of the whole protection and control system.

## TIMERS

Relays in which the operation of the contacts is subject to a timing set in the relay. This timing can be on pick up, drop out, cyclic ...with high accuracy and a wide range, from milliseconds to several hours, all of them available in the same relay.

When timing is on drop out or cyclic, an auxiliary supply is needed.

There is the possibility of having different voltages for supply and command of the timing, by choosing the option "independent command" (see model selection table in page 29).

## LATCHING RELAYS

ARTECHE latching relays have two stable positions for the output contacts. Depending on which coil is fed, contacts will change from one position to the other. The ARTECHE latching relays only have consumption during the change from one position to the other, having therefore no consumption in permanence.

## CONTACTORS

Their design is based on the instantaneous relays, but incorporating magnetic blow-out and ceramic shielding to protect the plastic materials from the electric arc created when opening high loads. This configuration allows them to open up to 15 Amps in 125 Vdc, 40ms inductive circuits.

## IMPULSE RELAYS

Similar to latching relay with a single input. Each impulse in the input makes the contact position change. An auxiliary supply is needed.



# RAILWAY APPLICATIONS

| MODEL              | ROLLING STOCK | SIGNALING | CONTACTS                               | WELD NO<br>TRANSFER<br>SECURITY<br>CONTACTS | NO WELD<br>CONTACTS |
|--------------------|---------------|-----------|----------------------------------------|---------------------------------------------|---------------------|
| Instantaneous      |               |           |                                        |                                             |                     |
| RD-2SY             | •             | •         | 2 CO                                   | •                                           | •                   |
| RF-4SY             | •             | •         | 4 CO                                   | •                                           | •                   |
| RJ-8SY             | •             | •         | 8 CO                                   | •                                           | •                   |
| RD-2SYDI / RD-2SYV | •             | •         | 2 CO                                   | •                                           | •                   |
| RF-4SYDI / RF-4SYV | •             | •         | 4 CO                                   | •                                           | •                   |
| RJ-8SYDI / RJ-8SYV | •             | •         | 8 CO                                   | •                                           | •                   |
| Timers             |               |           |                                        |                                             |                     |
| TDF-2              | •             | •         | 2 CO                                   | •                                           | •                   |
| TDF-4              | •             | •         | 4 CO                                   | •                                           | •                   |
| TDF-22             | •             | •         | 4 CO<br>(2 inst. + 2 timed.)           | •                                           | •                   |
| TDJ-8              | •             | •         | 8 CO                                   | •                                           | •                   |
| TDJ-44             | •             | •         | 8 CO<br>(4 inst. + 4 timed.)           | •                                           | •                   |
| TDF-4DO            | •             | •         | 4 CO                                   | •                                           | •                   |
| Latching           |               |           |                                        |                                             |                     |
| BF-3               | •             | •         | 3 CO                                   |                                             |                     |
| BF-4               | •             | •         | 4 CO                                   |                                             |                     |
| BJ-8               | •             | •         | 8 CO                                   |                                             |                     |
| BF-3BB             | •             | •         | 3 CO                                   |                                             |                     |
| BF-4BB             | •             | •         | 4 CO                                   |                                             |                     |
| BJ-8BB             | •             | •         | 8 CO                                   |                                             |                     |
| Contactors         |               |           |                                        |                                             |                     |
| CD-2               | •             | •         | 2 CO<br>(2NO Contactor +<br>2NC Relay) |                                             | •                   |
| CF-4               | •             | •         | 4 CO<br>(4NO Contactor +<br>4NC Relay) |                                             | •                   |
| CJ-8               | •             | •         | 8 CO<br>(8NO Contactor +<br>8NC Relay) |                                             | •                   |
| CD-2DI             | •             | •         | 2 CO<br>(2NO Contactor +<br>2NC Relay) |                                             | •                   |
| CF-4DI             | •             | •         | 4 CO<br>(4NO Contactor +<br>4NC Relay) |                                             | •                   |
| CJ-8DI             | •             | •         | 8 CO<br>(8NO Contactor +<br>8NC Relay) |                                             | •                   |
| Impulse relay      |               |           |                                        |                                             |                     |
| RBF-2              | •             | •         | 2CO                                    | •                                           | •                   |
| RBF-4              | •             | •         | 4CO                                    | •                                           | •                   |

# TECHNICAL FEATURES PER MODEL



› World-class range of auxiliary relays for energy sector, specially designed for the most demanding applications

# INSTANTANEOUS RELAYS

| Model | RD-2SY | RF-4SY | RJ-8SY |
|-------|--------|--------|--------|
|-------|--------|--------|--------|



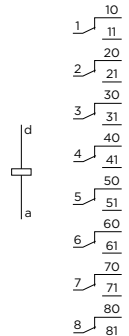
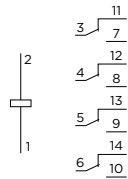
Applications

Frequent vibration and shock applications, as railway sector.

## Construction characteristics

| Contacts no. | 2 Changeover | 4 Changeover | 8 Changeover |
|--------------|--------------|--------------|--------------|
|--------------|--------------|--------------|--------------|

## Connections



## Options

With OP options

With OP options/Push-to-test button included

| Weight (g)      | 125                                            | 250                                            | 500                                            |
|-----------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Dimensions (mm) | (A) 22,5 x (B) 50,4 x (C) 72<br>(D short type) | (A) 42,5 x (B) 50,4 x (C) 72<br>(F short type) | (A) 82,5 x (B) 50,4 x (C) 72<br>(J short type) |

## Coil characteristics

| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 220 Vdc 24, 48, 63,5, 110, 127, 230, 400 <sup>(4)</sup> Vac (50-60 Hz) |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Voltage range                                       | +25% -30% U <sub>N</sub>                                                                         |
| Pick-up / release voltage                           | See pick-up/release voltage-temperature curves                                                   |
| Average consumption in permanence (U <sub>N</sub> ) | 2,6 W 3,9 W 6 W                                                                                  |

## Operating time

| Pick-up time  | < 20 ms                                                                           |
|---------------|-----------------------------------------------------------------------------------|
| Drop-out time | Vdc: <10 ms /<br>Vac or with LED: <50 ms Vdc: <15 ms /<br>Vac or with LED: <50 ms |

## Contacts

| Contact material                        | AgNi                                                                    |
|-----------------------------------------|-------------------------------------------------------------------------|
| Contacts resistance <sup>(2)</sup>      | ≤ 15 mΩ                                                                 |
| Max. contacts resistance <sup>(5)</sup> | 40 mΩ at 10 A                                                           |
| Distance between contacts               | 1,2 mm                                                                  |
| Permanent current                       | 10 A                                                                    |
| Instantaneous current                   | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms               |
| Wetting current/voltage                 | 12 Vdc, 10 mA                                                           |
| Max. making capacity                    | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s) |
| Breaking capacity                       | See breaking capacity curves (Contact configuration type B)             |
| Max. breaking capacity                  | See value for 50,000 operations                                         |
| U <sub>max</sub> opened contact         | 250 Vdc / 400 Vac                                                       |

## General data

| Mechanical endurance              | 3*10 <sup>7</sup> operations                                         |
|-----------------------------------|----------------------------------------------------------------------|
| Dielectric strength               | 2 kV (between independent circuits) / 1,5 kV (between open contacts) |
| Impulse voltage                   | 5 kV (between independent circuits) / 2,5 kV (between open contacts) |
| Insulation resistance             | >1000 GΩ                                                             |
| Operating temperature             | -65°C +70°C                                                          |
| Storage temperature               | -65°C +85°C                                                          |
| Max. operating humidity           | 93% / +40°C                                                          |
| Operating altitude <sup>(3)</sup> | <2000 m                                                              |

<sup>(1)</sup> Other voltages upon request

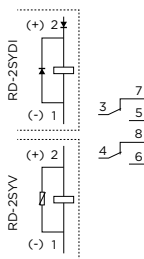
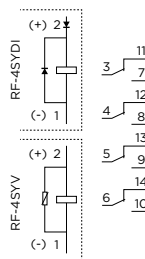
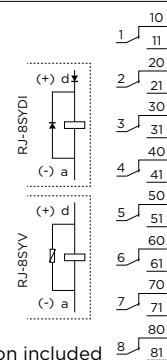
<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> Voltage not recognized by UL

<sup>(5)</sup> At the end of working life

# INSTANTANEOUS RELAYS WITH COIL OVERVOLTAGE PROTECTION

| Model                                                                                                                                                                                                                                                             | RD-2SYDI • RD-2SYV                                                                                                                                  |  | RF-4SYDI • RF-4SYV                                                                 | RJ-8SYDI • RJ-8SYV                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <div></div> |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Applications                                                                                                                                                                                                                                                      | Frequent Vibration and Shock applications, as railway sector.<br>Intended to protect the contact of the equipment that feeds the coil in our relay. |  |                                                                                    |                                                                                     |
| Construction characteristics                                                                                                                                                                                                                                      |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Contacts no.                                                                                                                                                                                                                                                      | 2 Changeover                                                                                                                                        |  | 4 Changeover                                                                       | 8 Changeover                                                                        |
| Connections                                                                                                                                                                                                                                                       |                                                                    |  |  |  |
| Options                                                                                                                                                                                                                                                           | With OP options                                                                                                                                     |  | With OP options/Push-to-test button included                                       |                                                                                     |
| Weight (g)                                                                                                                                                                                                                                                        | 125                                                                                                                                                 |  | 250                                                                                | 500                                                                                 |
| Dimensions (mm)                                                                                                                                                                                                                                                   | (A) 22,5 x (B) 50,4 x (C) 72<br>(D short type)                                                                                                      |  | (A) 42,5 x (B) 50,4 x (C) 72<br>(F short type)                                     | (A) 82,5 x (B) 50,4 x (C) 72<br>(J short type)                                      |
| Coil characteristics                                                                                                                                                                                                                                              |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Standard voltages <sup>(1)</sup>                                                                                                                                                                                                                                  | 24, 48, 72, 96, 110, 125, 220 Vdc 24, 48, 63,5, 110, 127, 230, 400 <sup>(4)</sup> Vac (50-60 Hz)                                                    |  |                                                                                    |                                                                                     |
| Voltage range                                                                                                                                                                                                                                                     | +25% -30% U <sub>N</sub>                                                                                                                            |  |                                                                                    |                                                                                     |
| Pick-up / release voltage                                                                                                                                                                                                                                         | See pick-up/release voltage-temperature curves                                                                                                      |  |                                                                                    |                                                                                     |
| Average consumption in permanence (U <sub>N</sub> )                                                                                                                                                                                                               | 2,6 W                                                                                                                                               |  | 3,9 W                                                                              | 6 W                                                                                 |
| Operating time                                                                                                                                                                                                                                                    |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Pick-up time                                                                                                                                                                                                                                                      |                                                                                                                                                     |  | < 20 ms                                                                            |                                                                                     |
| Drop-out time                                                                                                                                                                                                                                                     |                                                                                                                                                     |  | V Series: <25ms<br>DI Series: <50 ms                                               |                                                                                     |
| Contacts                                                                                                                                                                                                                                                          |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Contact material                                                                                                                                                                                                                                                  | AgNi                                                                                                                                                |  |                                                                                    |                                                                                     |
| Contacts resistance <sup>(2)</sup>                                                                                                                                                                                                                                | ≤ 15 mΩ                                                                                                                                             |  |                                                                                    |                                                                                     |
| Max. contacts resistance <sup>(5)</sup>                                                                                                                                                                                                                           | 40 mΩ at 10 A                                                                                                                                       |  |                                                                                    |                                                                                     |
| Distance between contacts                                                                                                                                                                                                                                         | 1,2 mm                                                                                                                                              |  |                                                                                    |                                                                                     |
| Permanent current                                                                                                                                                                                                                                                 | 10 A                                                                                                                                                |  |                                                                                    |                                                                                     |
| Instantaneous current                                                                                                                                                                                                                                             | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms                                                                                           |  |                                                                                    |                                                                                     |
| Wetting current/voltage                                                                                                                                                                                                                                           | 12 Vdc, 10 mA                                                                                                                                       |  |                                                                                    |                                                                                     |
| Max. making capacity                                                                                                                                                                                                                                              | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                                             |  |                                                                                    |                                                                                     |
| Breaking capacity                                                                                                                                                                                                                                                 | See breaking capacity curves (Contact configuration type B)                                                                                         |  |                                                                                    |                                                                                     |
| Max. breaking capacity                                                                                                                                                                                                                                            | See value for 50,000 operations                                                                                                                     |  |                                                                                    |                                                                                     |
| U <sub>max</sub> opened contact                                                                                                                                                                                                                                   | 250 Vdc / 400 Vac                                                                                                                                   |  |                                                                                    |                                                                                     |
| General data                                                                                                                                                                                                                                                      |                                                                                                                                                     |  |                                                                                    |                                                                                     |
| Mechanical endurance                                                                                                                                                                                                                                              | 3*10 <sup>7</sup> operations                                                                                                                        |  |                                                                                    |                                                                                     |
| Dielectric strength                                                                                                                                                                                                                                               | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                                                |  |                                                                                    |                                                                                     |
| Impulse voltage                                                                                                                                                                                                                                                   | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                                                |  |                                                                                    |                                                                                     |
| Insulation resistance                                                                                                                                                                                                                                             | >1000 GΩ                                                                                                                                            |  |                                                                                    |                                                                                     |
| Operating temperature                                                                                                                                                                                                                                             | -65°C +70°C                                                                                                                                         |  |                                                                                    |                                                                                     |
| Storage temperature                                                                                                                                                                                                                                               | -65°C +85°C                                                                                                                                         |  |                                                                                    |                                                                                     |
| Max. operating humidity                                                                                                                                                                                                                                           | 93% / +40°C                                                                                                                                         |  |                                                                                    |                                                                                     |
| Operating altitude <sup>(3)</sup>                                                                                                                                                                                                                                 | <2000 m                                                                                                                                             |  |                                                                                    |                                                                                     |

<sup>(1)</sup> Other voltages upon request

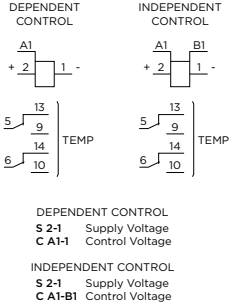
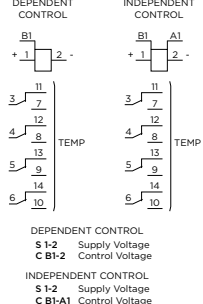
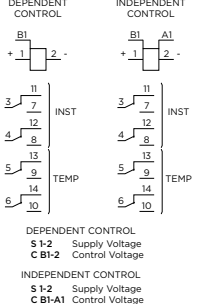
<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> Voltage not recognized by UL

<sup>(5)</sup> At the end of working life

## TIME-LAG RELAYS (I)

| Model                                               | TDF-2                                                                                                                                                             | TDF-4                                                                                                                                                              | TDF-22                                                                                                                                                              |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                                                                  |                                                                                  |                                                                                  |
| Applications                                        | Electrical command timing                                                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                     |
| Construction characteristics                        |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Timing Contacts no.                                 | 2 Changeover                                                                                                                                                      | 4 Changeover                                                                                                                                                       | 2 Changeover                                                                                                                                                        |
| Instantaneous contact no.                           | 0 Changeover                                                                                                                                                      | 0 Changeover                                                                                                                                                       | 2 Changeover                                                                                                                                                        |
| Connections                                         | <div><div>DEPENDENT CONTROL</div><div>INDEPENDENT CONTROL</div><div></div></div> | <div><div>DEPENDENT CONTROL</div><div>INDEPENDENT CONTROL</div><div></div></div> | <div><div>DEPENDENT CONTROL</div><div>INDEPENDENT CONTROL</div><div></div></div> |
| Options (With OP options)                           |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Weight (g)                                          | 265                                                                                                                                                               |                                                                                                                                                                    |                                                                                                                                                                     |
| Dimensions (mm)                                     | (A) 42,5 x (B) 50,4 x (C) 96,6 (F large type)                                                                                                                     |                                                                                                                                                                    |                                                                                                                                                                     |
| Coil characteristics                                |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 220, 250 <sup>(4)</sup> Vdc/Vac (50-60 Hz)                                                                                              |                                                                                                                                                                    |                                                                                                                                                                     |
| Voltage range                                       | +25% -30% U <sub>N</sub> (except range 250) <sup>(4)</sup>                                                                                                        |                                                                                                                                                                    |                                                                                                                                                                     |
| Pick-up / release voltage                           | See power supply-temperature charts for time-lag relays                                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |
| Average consumption in permanence (U <sub>N</sub> ) | 2,6 W                                                                                                                                                             | 3,85 W                                                                                                                                                             | 5,35 W                                                                                                                                                              |
| Operating time                                      |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Time range                                          | between 0,03 s to 99 h                                                                                                                                            |                                                                                                                                                                    |                                                                                                                                                                     |
| Pick-up time                                        | < 23 ms                                                                                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |
| Drop-out time                                       | < 40 ms                                                                                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |
| Contacts                                            |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Contact type                                        | 2 Changeover                                                                                                                                                      | 4 Changeover                                                                                                                                                       |                                                                                                                                                                     |
| Contact material                                    | AgNi                                                                                                                                                              |                                                                                                                                                                    |                                                                                                                                                                     |
| Contacts resistance <sup>(2)</sup>                  | ≤ 15 mΩ                                                                                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |
| Max. contacts resistance <sup>(5)</sup>             | 40 mΩ at 10 A                                                                                                                                                     |                                                                                                                                                                    |                                                                                                                                                                     |
| Distance between contacts                           | 1,2 mm                                                                                                                                                            |                                                                                                                                                                    |                                                                                                                                                                     |
| Permanent current                                   | 10 A                                                                                                                                                              |                                                                                                                                                                    |                                                                                                                                                                     |
| Instantaneous current                               | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                     |
| Wetting current/voltage                             | 12 Vdc, 10 mA                                                                                                                                                     |                                                                                                                                                                    |                                                                                                                                                                     |
| Max. making capacity                                | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |
| Breaking capacity                                   | See breaking capacity curves (Contact configuration type B)                                                                                                       |                                                                                                                                                                    |                                                                                                                                                                     |
| Max. breaking capacity                              | See value for 50,000 operations                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| U <sub>max</sub> opened contact                     | 250 Vdc / 400 Vac                                                                                                                                                 |                                                                                                                                                                    |                                                                                                                                                                     |
| General data                                        |                                                                                                                                                                   |                                                                                                                                                                    |                                                                                                                                                                     |
| Mechanical endurance                                | 10 <sup>7</sup> operations                                                                                                                                        |                                                                                                                                                                    |                                                                                                                                                                     |
| Dielectric strength                                 | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                                                              |                                                                                                                                                                    |                                                                                                                                                                     |
| Impulse voltage                                     | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                                                              |                                                                                                                                                                    |                                                                                                                                                                     |
| Insulation resistance                               | >1000 GΩ                                                                                                                                                          |                                                                                                                                                                    |                                                                                                                                                                     |
| Operating temperature                               | Up to 125 Vdc: -40°C +70°C / 220 Vdc - 250 Vdc: -40°+55°C                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                     |
| Storage temperature                                 | -50°C +85°C                                                                                                                                                       |                                                                                                                                                                    |                                                                                                                                                                     |
| Max. operating humidity                             | 93% / +40°C                                                                                                                                                       |                                                                                                                                                                    |                                                                                                                                                                     |
| Operating altitude <sup>(3)</sup>                   | <2000 m                                                                                                                                                           |                                                                                                                                                                    |                                                                                                                                                                     |

<sup>(1)</sup> Other voltages upon request

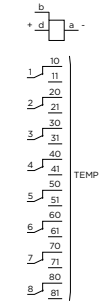
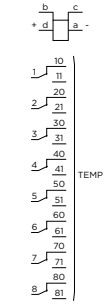
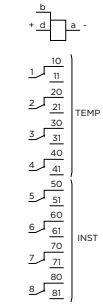
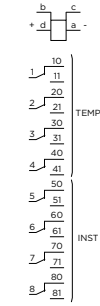
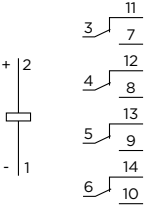
<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> UL in progress for this voltage

<sup>(5)</sup> At the end of working life

# TIME-LAG RELAYS (II)

| Model                                               | TDJ-8                                                                                                                                                                                                                                                                                                                         | TDJ-44                                                                                                                                                                                                                                                                                                                         | TDF-4 DO                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                              |                                                                                                                                                                                  |
| Applications                                        | Electrical Command Timing                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                | Selectable drop out timing with one single input                                                                                                                                                                                                                    |
| Construction characteristics                        |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Timing Contacts no.                                 | 8 Changeover                                                                                                                                                                                                                                                                                                                  | 4 Changeover                                                                                                                                                                                                                                                                                                                   | 4 Changeover                                                                                                                                                                                                                                                        |
| Instantaneous contact no.                           | 0 Changeover                                                                                                                                                                                                                                                                                                                  | 4 Changeover                                                                                                                                                                                                                                                                                                                   | 0 Changeover                                                                                                                                                                                                                                                        |
| Connections                                         | <div><div>DEPENDENT CONTROL</div><div>INDEPENDENT CONTROL</div><div></div><div></div><div><p>S d-a Supply Voltage<br/>C b-a Control Voltage</p></div></div> | <div><div>DEPENDENT CONTROL</div><div>INDEPENDENT CONTROL</div><div></div><div></div><div><p>S d-a Supply Voltage<br/>C b-a Control Voltage</p></div></div> | <div></div> <div>Fixed timing / Selectable by front potentiometer</div>                                                                                                          |
| Options (With OP options)                           |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Weight (g)                                          | 500                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                | 265                                                                                                                                                                                                                                                                 |
| Dimensions (mm)                                     | (A) 82,5 x (B) 50,4 x (C) 96,6 (large type)                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                | (A) 42,5 * (B) 50,4 * (C) 96,6 (large type)                                                                                                                                                                                                                         |
| Coil characteristics                                |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 220, 250 <sup>(4)</sup> Vdc/Vac (50-60 Hz)                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                | 24, 48, 72, 96, 110 VDC                                                                                                                                                                                                                                             |
| Voltage range                                       | +25% -30% U <sub>N</sub> (except range 250: +10% -20%)                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                | 25% -30%                                                                                                                                                                                                                                                            |
| Pick-up / release voltage                           | See power supply-temperature charts for time-lag relays                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Average consumption in permanence (U <sub>N</sub> ) | 6 W                                                                                                                                                                                                                                                                                                                           | 7,9 W                                                                                                                                                                                                                                                                                                                          | < 4 W                                                                                                                                                                                                                                                               |
| Operating time                                      |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Time range                                          | between 0,03 s to 99 h                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                | Fixed, defined during purchase order: between 0 and 1000 ms <sup>(6)</sup> Fixed , selectable by front potentiometer: 0-500ms/100-600ms/200-700ms/300-800ms (limit of coil voltage 72Vdc)/400-900ms/500-1000ms/and intermediate combinations (with steps of 500ms.) |
| Pick-up time                                        | <23 ms                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                | < 23ms                                                                                                                                                                                                                                                              |
| Drop-out time                                       | <50 ms                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Maximun pick up time                                | 1000ms. for the entire range of voltages and temperatures or any combination thereof                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Contacts                                            |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Contact type                                        | 8 Changeover                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                | 4 Changeover                                                                                                                                                                                                                                                        |
| Contact material                                    | AgNi                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Contacts resistance <sup>(2)</sup>                  | ≤ 15 mΩ                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Max. contacts resistance <sup>(5)</sup>             | 40 mΩ a 10 A                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Distance between contacts                           | 1,2 mm                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Permanent current                                   | 10 A                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Instantaneous current                               | 30 A during 1s / 80 A during 200 ms / 200 A during 10 ms                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Wetting current/voltage                             | 12 Vdc, 10 mA                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Max. making capacity                                | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Breaking capacity                                   | See breaking capacity curves (Contact configuration type B)                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Max. breaking capacity                              | See value for 50,000 operations                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| U <sub>max</sub> opened contact                     | 250 Vdc / 400 Vac                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| General data                                        |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Mechanical endurance                                | 10 <sup>7</sup> operations                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Dielectric strength                                 | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                | 2,2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                                                                                                                                                              |
| Impulse voltage                                     | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Insulation resistance                               | >1000 GΩ                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Operating temperature                               | Hasta 125Vdc -40°C +70°C / 220Vdc - 250Vdc -40°C +55°C                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Storage temperature                                 | -50°C +85°C                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Max. operating humidity                             | 93% / +40°C                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |
| Operating altitude <sup>(2)</sup>                   | <2000 m                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     |

<sup>(1)</sup> Other voltages upon request

<sup>(2)</sup> Guarantee data for relays just manufactured

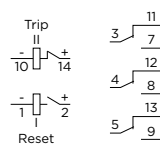
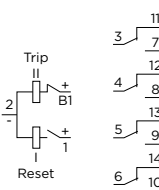
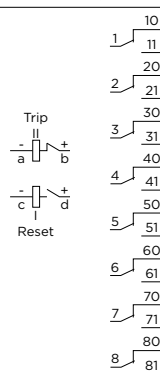
<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> UL in progress for this voltage

<sup>(5)</sup> At the end of working life

<sup>(6)</sup> Except for 72Vdc, between 0-800 ms

# GENERAL PURPOSE LATCHING RELAYS

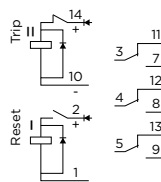
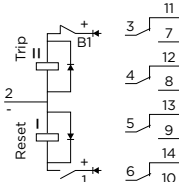
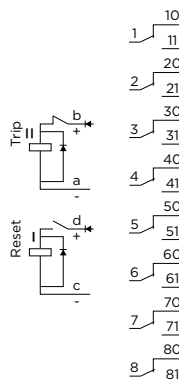
| Model                                                                                                                                                                                                                                                             | BF-3                                                                                                                           | BF-4                                                                               | BJ-8                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <div></div> |                                                                                                                                |                                                                                    |                                                                                     |
| Applications                                                                                                                                                                                                                                                      | Relays with two stable positions. Required when the position memory (open-close, automatic-manual, local-remote...) is needed. |                                                                                    |                                                                                     |
| Construction characteristics                                                                                                                                                                                                                                      |                                                                                                                                |                                                                                    |                                                                                     |
| Contacts no.                                                                                                                                                                                                                                                      | 3 Changeover                                                                                                                   | 4 Changeover                                                                       | 8 Changeover                                                                        |
| Connections                                                                                                                                                                                                                                                       |                                               |  |  |
| Options                                                                                                                                                                                                                                                           | Options are not available                                                                                                      |                                                                                    |                                                                                     |
| Weight (g)                                                                                                                                                                                                                                                        | 300                                                                                                                            |                                                                                    | 600                                                                                 |
| Dimensions (mm)                                                                                                                                                                                                                                                   | (A) 45 x (B) 45 x (C) 96,5<br>(F large type)                                                                                   |                                                                                    | (A) 90 x (B) 50 x (C) 100,5<br>(J large type)                                       |
| Coil characteristics                                                                                                                                                                                                                                              |                                                                                                                                |                                                                                    |                                                                                     |
| Standard voltages <sup>(1)</sup>                                                                                                                                                                                                                                  | 24, 48, 72, 96, 110, 125, 220 Vdc / 63,5, 110, 127, 230 Vac (50-60 Hz)                                                         |                                                                                    |                                                                                     |
| Voltage range                                                                                                                                                                                                                                                     | +25% -30% U <sub>N</sub>                                                                                                       |                                                                                    |                                                                                     |
| Pick-up voltage                                                                                                                                                                                                                                                   | See pick-up voltage / temperature curves for Latching relays                                                                   |                                                                                    |                                                                                     |
| Average consumption only in the change-over                                                                                                                                                                                                                       | 6 W                                                                                                                            |                                                                                    | 12 W                                                                                |
| Operating time                                                                                                                                                                                                                                                    |                                                                                                                                |                                                                                    |                                                                                     |
| Pick-up time                                                                                                                                                                                                                                                      | <20 ms                                                                                                                         |                                                                                    |                                                                                     |
| Contacts                                                                                                                                                                                                                                                          |                                                                                                                                |                                                                                    |                                                                                     |
| Contact material                                                                                                                                                                                                                                                  | AgNi                                                                                                                           |                                                                                    |                                                                                     |
| Contacts resistance <sup>(3)</sup>                                                                                                                                                                                                                                | ≤ 15 mΩ                                                                                                                        |                                                                                    |                                                                                     |
| Max. contacts resistance <sup>(4)</sup>                                                                                                                                                                                                                           | 40 mΩ at 10 A                                                                                                                  |                                                                                    |                                                                                     |
| Distance between contacts                                                                                                                                                                                                                                         | 1,8 mm                                                                                                                         |                                                                                    |                                                                                     |
| Permanent current                                                                                                                                                                                                                                                 | 10 A                                                                                                                           |                                                                                    |                                                                                     |
| Instantaneous current                                                                                                                                                                                                                                             | 80 A during 200 ms / 200 A during 10 ms                                                                                        |                                                                                    |                                                                                     |
| Wetting current/voltage                                                                                                                                                                                                                                           | 12 Vdc, 10 mA                                                                                                                  |                                                                                    |                                                                                     |
| Max. making capacity                                                                                                                                                                                                                                              | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                        |                                                                                    |                                                                                     |
| Breaking capacity                                                                                                                                                                                                                                                 | See breaking capacity curves (Contact configuration type A)                                                                    |                                                                                    |                                                                                     |
| Max. breaking capacity                                                                                                                                                                                                                                            | See value for 50,000 operations                                                                                                |                                                                                    |                                                                                     |
| U <sub>max</sub> opened contact                                                                                                                                                                                                                                   | 250 Vdc / 400 Vac                                                                                                              |                                                                                    |                                                                                     |
| General data                                                                                                                                                                                                                                                      |                                                                                                                                |                                                                                    |                                                                                     |
| Mechanical endurance                                                                                                                                                                                                                                              | 10 <sup>7</sup> operations                                                                                                     |                                                                                    |                                                                                     |
| Dielectric strength                                                                                                                                                                                                                                               | 2 kV between independent circuits and between open contacts                                                                    |                                                                                    |                                                                                     |
| Impulse voltage                                                                                                                                                                                                                                                   | 5 kV between independent circuits and between open contacts                                                                    |                                                                                    |                                                                                     |
| Insulation resistance                                                                                                                                                                                                                                             | >1000 GΩ                                                                                                                       |                                                                                    |                                                                                     |
| Operating temperature                                                                                                                                                                                                                                             | -40°C +70°C                                                                                                                    |                                                                                    |                                                                                     |
| Storage temperature                                                                                                                                                                                                                                               | -40°C +85°C                                                                                                                    |                                                                                    |                                                                                     |
| Max. operating humidity                                                                                                                                                                                                                                           | 93% / +40°C                                                                                                                    |                                                                                    |                                                                                     |
| Operating altitude <sup>(2)</sup>                                                                                                                                                                                                                                 | <2000 m                                                                                                                        |                                                                                    |                                                                                     |

<sup>(1)</sup> Other voltages upon request  
<sup>(2)</sup> Ask for higher altitudes

<sup>(3)</sup> Guarantee data for relays just manufactured

<sup>(4)</sup> At the end of working life

# LATCHING RELAYS WITH COIL OVERVOLTAGE PROTECTION

| Model                                                                                                                                                                                                                                                              | BF-3BB                                                                             | BF-4BB                                                                             | BJ-8BB                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <div></div> |                                                                                    |                                                                                    |                                                                                     |
| Applications                                                                                                                                                                                                                                                       | Intended to protect the contact of the equipment that feeds the coil in our relay. |                                                                                    |                                                                                     |
| Construction characteristics                                                                                                                                                                                                                                       |                                                                                    |                                                                                    |                                                                                     |
| Contacts no.                                                                                                                                                                                                                                                       | 3 Changeover                                                                       | 4 Changeover                                                                       | 8 Changeover                                                                        |
| Connections                                                                                                                                                                                                                                                        |   |  |  |
| Options                                                                                                                                                                                                                                                            | Options are not available                                                          |                                                                                    |                                                                                     |
| Weight (g)                                                                                                                                                                                                                                                         | 300                                                                                |                                                                                    | 600                                                                                 |
| Dimensions (mm)                                                                                                                                                                                                                                                    | (A) 45 x (B) 45 x (C) 96,5<br>(F large type)                                       |                                                                                    | (A) 90 x (B) 50 x (C) 100,5<br>(J large type)                                       |
| Coil characteristics                                                                                                                                                                                                                                               |                                                                                    |                                                                                    |                                                                                     |
| Standard voltages <sup>(1)</sup>                                                                                                                                                                                                                                   | 24, 48, 72, 110, 125, 220 Vdc <sup>(3)</sup>                                       |                                                                                    |                                                                                     |
| Voltage range                                                                                                                                                                                                                                                      | +25% -30% U <sub>N</sub>                                                           |                                                                                    |                                                                                     |
| Pick-up voltage                                                                                                                                                                                                                                                    | See pick-up voltage / temperature curves for Latching relays                       |                                                                                    |                                                                                     |
| Average consumption only in the change-over                                                                                                                                                                                                                        | 6 W                                                                                |                                                                                    | 12 W                                                                                |
| Operating time                                                                                                                                                                                                                                                     |                                                                                    |                                                                                    |                                                                                     |
| Pick-up time                                                                                                                                                                                                                                                       | <20 ms                                                                             |                                                                                    |                                                                                     |
| Contacts                                                                                                                                                                                                                                                           |                                                                                    |                                                                                    |                                                                                     |
| Contact material                                                                                                                                                                                                                                                   | AgNi                                                                               |                                                                                    |                                                                                     |
| Contacts resistance <sup>(4)</sup>                                                                                                                                                                                                                                 | ≤ 15 mΩ                                                                            |                                                                                    |                                                                                     |
| Max. contacts resistance <sup>(5)</sup>                                                                                                                                                                                                                            | 40 mΩ at 10 A                                                                      |                                                                                    |                                                                                     |
| Distance between contacts                                                                                                                                                                                                                                          | 1,8 mm                                                                             |                                                                                    |                                                                                     |
| Permanent current                                                                                                                                                                                                                                                  | 10 A                                                                               |                                                                                    |                                                                                     |
| Instantaneous current                                                                                                                                                                                                                                              | 80 A during 200 ms / 200 A during 10 ms                                            |                                                                                    |                                                                                     |
| Wetting current/voltage                                                                                                                                                                                                                                            | 12 Vdc, 10 mA                                                                      |                                                                                    |                                                                                     |
| Max. making capacity                                                                                                                                                                                                                                               | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)            |                                                                                    |                                                                                     |
| Breaking capacity                                                                                                                                                                                                                                                  | See breaking capacity curves (Contact configuration type A)                        |                                                                                    |                                                                                     |
| Max. breaking capacity                                                                                                                                                                                                                                             | See value for 50,000 operations                                                    |                                                                                    |                                                                                     |
| U <sub>max</sub> opened contact                                                                                                                                                                                                                                    | 250 Vdc / 400 Vac                                                                  |                                                                                    |                                                                                     |
| General data                                                                                                                                                                                                                                                       |                                                                                    |                                                                                    |                                                                                     |
| Mechanical endurance                                                                                                                                                                                                                                               | 10 <sup>7</sup> operations                                                         |                                                                                    |                                                                                     |
| Dielectric strength                                                                                                                                                                                                                                                | 2 kV between independent circuits and between open contacts                        |                                                                                    |                                                                                     |
| Impulse voltage                                                                                                                                                                                                                                                    | 5 kV between independent circuits and between open contacts                        |                                                                                    |                                                                                     |
| Insulation resistance                                                                                                                                                                                                                                              | >1000 GΩ                                                                           |                                                                                    |                                                                                     |
| Operating temperature                                                                                                                                                                                                                                              | -40°C +70°C                                                                        |                                                                                    |                                                                                     |
| Storage temperature                                                                                                                                                                                                                                                | -40°C +85°C                                                                        |                                                                                    |                                                                                     |
| Max. operating humidity                                                                                                                                                                                                                                            | 93% / +40°C                                                                        |                                                                                    |                                                                                     |
| Operating altitude <sup>(2)</sup>                                                                                                                                                                                                                                  | <2000 m                                                                            |                                                                                    |                                                                                     |

<sup>(1)</sup> Other voltages upon request

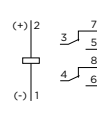
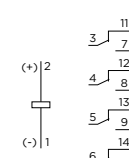
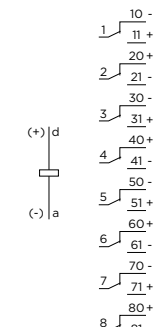
<sup>(2)</sup> Ask for higher altitudes

<sup>(3)</sup> Vac voltages upon request

<sup>(4)</sup> Guarantee data for relays just manufactured

<sup>(5)</sup> At the end of working life

## CONTACTORS (I)

| Model                                               | CD-2                                                                                                                           | CF-4                                                                               | CJ-8                                                                                |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                     |                                               |  |  |
| Applications                                        | Opening inductive load in DC circuits. NO contacts are heavy duty contacts, and NC contacts are standard contacts.             |                                                                                    |                                                                                     |
| Construction characteristics                        |                                                                                                                                |                                                                                    |                                                                                     |
| Contacts no.                                        | 2 Changeover polarized                                                                                                         | 4 Changeover polarized                                                             | 8 Changeover polarized                                                              |
| Connections                                         |                                               |  |  |
| Options                                             |                                                                                                                                |                                                                                    |                                                                                     |
| Weight (g)                                          | 129                                                                                                                            | 254                                                                                | 505                                                                                 |
| Dimensions (mm)                                     | (A) 22,5 x (B) 50,4 x (C) 72 (D short type)                                                                                    | (A) 42,5 x (B) 50,4 x (C) 72 (F short type)                                        | (A) 82,5 x (B) 50,4 x (C) 72 (J short type)                                         |
| Coil characteristics                                |                                                                                                                                |                                                                                    |                                                                                     |
| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 220 Vdc / 24, 48, 63,5, 110, 230 Vac (50-60Hz)                                                       |                                                                                    |                                                                                     |
| Voltage range                                       | +25% -30% U <sub>N</sub>                                                                                                       |                                                                                    |                                                                                     |
| Pick-up / release voltage                           | See pick-up/release voltage-temperature curves                                                                                 |                                                                                    |                                                                                     |
| Average consumption in permanence (U <sub>N</sub> ) | 2,6 W                                                                                                                          | 3,9 W                                                                              | 6 W                                                                                 |
| Operating time                                      |                                                                                                                                |                                                                                    |                                                                                     |
| Pick-up time                                        | < 20 ms                                                                                                                        |                                                                                    |                                                                                     |
| Drop-out time                                       | 50ms                                                                                                                           |                                                                                    |                                                                                     |
| Contacts                                            |                                                                                                                                |                                                                                    |                                                                                     |
| Contact material                                    | AgNi                                                                                                                           |                                                                                    |                                                                                     |
| Contacts resistance <sup>(2)</sup>                  | ≤ 15 mΩ                                                                                                                        |                                                                                    |                                                                                     |
| Max. contacts resistance <sup>(4)</sup>             | 40 mΩ at 10 A                                                                                                                  |                                                                                    |                                                                                     |
| Distance between contacts                           | 1,2 mm                                                                                                                         |                                                                                    |                                                                                     |
| Permanent current                                   | 10 A                                                                                                                           |                                                                                    |                                                                                     |
| Instantaneous current                               | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms                                                                      |                                                                                    |                                                                                     |
| Wetting current/voltage                             | 12 Vdc, 10 mA                                                                                                                  |                                                                                    |                                                                                     |
| Max. making capacity                                | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                        |                                                                                    |                                                                                     |
| Breaking capacity                                   | See breaking capacity curves (Contactor curve for the NO contacts, standard instantaneous relay curves for NC contacts)        |                                                                                    |                                                                                     |
| Max. breaking capacity                              | 125 VDC - 40ms: Contacts NA 6 Amp. 10 <sup>5</sup> operations - 15 Amp. 100 operations; Contacts NC 0,52 Amp. 50000 operations |                                                                                    |                                                                                     |
| U <sub>max</sub> opened contact                     | 250 Vdc / 400 Vac                                                                                                              |                                                                                    |                                                                                     |
| General data                                        |                                                                                                                                |                                                                                    |                                                                                     |
| Mechanical endurance                                | 10 <sup>7</sup> operations                                                                                                     |                                                                                    |                                                                                     |
| Dielectric strength                                 | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                           |                                                                                    |                                                                                     |
| Impulse voltage                                     | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                           |                                                                                    |                                                                                     |
| Insulation resistance                               | >1000 GΩ                                                                                                                       |                                                                                    |                                                                                     |
| Operating temperature                               | -40°C +70°C                                                                                                                    |                                                                                    |                                                                                     |
| Storage temperature                                 | -40°C + 85°C                                                                                                                   |                                                                                    |                                                                                     |
| Max. operating humidity                             | 93% / +40°C                                                                                                                    |                                                                                    |                                                                                     |
| Operating altitude <sup>(3)</sup>                   | <2000 m                                                                                                                        |                                                                                    |                                                                                     |

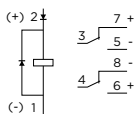
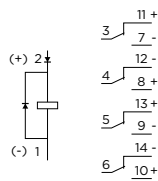
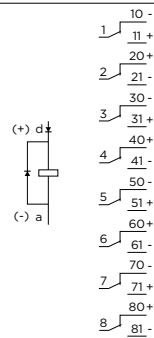
<sup>(1)</sup> Other voltages upon request

<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> At the end of working life

# CONTACTORS (II)

| Model                                               | CD-2DI                                                                                                                         | CF-4DI                                                                             | CJ-8DI                                                                              |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                     |                                               |  |  |
| Applications                                        | Contactors with coil overvoltage protection                                                                                    |                                                                                    |                                                                                     |
| Construction characteristics                        |                                                                                                                                |                                                                                    |                                                                                     |
| Contacts no.                                        | 2 Changeover polarized                                                                                                         | 4 Changeover polarized                                                             | 8 Changeover polarized                                                              |
| Connections                                         |                                               |  |  |
| Options                                             |                                                                                                                                |                                                                                    |                                                                                     |
| Weight (g)                                          | 129                                                                                                                            | 254                                                                                | 505                                                                                 |
| Dimensions (mm)                                     | (A) 22,5 x (B) 50,4 x (C) 72<br>(D short type)                                                                                 | (A) 42,5 x (B) 50,4 x (C) 72<br>(F short type)                                     | (A) 82,5 x (B) 50,4 x (C) 72<br>(J short type)                                      |
| Coil characteristics                                |                                                                                                                                |                                                                                    |                                                                                     |
| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 220 Vdc / 24, 48, 63,5, 110, 230 Vac (50-60Hz)                                                       |                                                                                    |                                                                                     |
| Voltage range                                       | +25% -30% U <sub>N</sub>                                                                                                       |                                                                                    |                                                                                     |
| Pick-up / release voltage                           | See pick-up/release voltage-temperature curves                                                                                 |                                                                                    |                                                                                     |
| Average consumption in permanence (U <sub>N</sub> ) | 2,6 W                                                                                                                          | 3,9 W                                                                              | 6 W                                                                                 |
| Operating time                                      |                                                                                                                                |                                                                                    |                                                                                     |
| Pick-up time                                        | <20 ms                                                                                                                         |                                                                                    |                                                                                     |
| Drop-out time                                       | <50ms                                                                                                                          |                                                                                    |                                                                                     |
| Contacts                                            |                                                                                                                                |                                                                                    |                                                                                     |
| Contact material                                    | AgNi                                                                                                                           |                                                                                    |                                                                                     |
| Contacts resistance <sup>(2)</sup>                  | ≤ 15 mΩ                                                                                                                        |                                                                                    |                                                                                     |
| Max. contacts resistance <sup>(4)</sup>             | 40 mΩ at 10 A                                                                                                                  |                                                                                    |                                                                                     |
| Distance between contacts                           | 1,2 mm                                                                                                                         |                                                                                    |                                                                                     |
| Permanent current                                   | 10 A                                                                                                                           |                                                                                    |                                                                                     |
| Instantaneous current                               | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms                                                                      |                                                                                    |                                                                                     |
| Wetting current/voltage                             | 12 Vdc, 10 mA                                                                                                                  |                                                                                    |                                                                                     |
| Max. making capacity                                | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                        |                                                                                    |                                                                                     |
| Breaking capacity                                   | See breaking capacity curves (Contactor curve for the NO contacts, standard instantaneous relay curves for NC contacts)        |                                                                                    |                                                                                     |
| Max. breaking capacity                              | 125 VDC - 40ms: Contacts NA 6 Amp. 10 <sup>5</sup> operations - 15 Amp. 100 operations; Contacts NC 0,52 Amp. 50000 operations |                                                                                    |                                                                                     |
| U <sub>max</sub> opened contact                     | 250 Vdc / 400 Vac                                                                                                              |                                                                                    |                                                                                     |
| General data                                        |                                                                                                                                |                                                                                    |                                                                                     |
| Mechanical endurance                                | 10 <sup>7</sup> operations                                                                                                     |                                                                                    |                                                                                     |
| Dielectric strength                                 | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                           |                                                                                    |                                                                                     |
| Impulse voltage                                     | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                           |                                                                                    |                                                                                     |
| Insulation resistance                               | >1000 GΩ                                                                                                                       |                                                                                    |                                                                                     |
| Operating temperature                               | -40°C +70°C                                                                                                                    |                                                                                    |                                                                                     |
| Storage temperature                                 | -40°C +85°C                                                                                                                    |                                                                                    |                                                                                     |
| Max. operating humidity                             | 93% / +40°C                                                                                                                    |                                                                                    |                                                                                     |
| Operating altitude <sup>(3)</sup>                   | <2000 m                                                                                                                        |                                                                                    |                                                                                     |

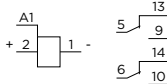
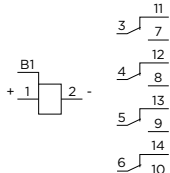
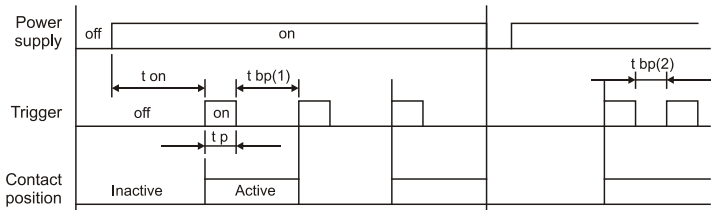
<sup>(1)</sup> Other voltages upon request

<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> At the end of working life

# IMPULSE RELAY

| Model                                               | RBF-2                                                                                                                                                                                                                                                                                                        | RBF-4                                                                                                                                                     |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | <div></div> <div></div>                                                                                                                  |                                                                                                                                                           |
| Applications                                        | Latching relay with a single input, the state of the contacts change with each input pulse. Auxiliary supply is needed.                                                                                                                                                                                      |                                                                                                                                                           |
| Construction characteristics                        |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Contacts no.                                        | 2 Changeover                                                                                                                                                                                                                                                                                                 | 4 Changeover                                                                                                                                              |
| Connections                                         | <div></div> <div>S 2-1 Supply Voltage<br/>C A1-1 Control Voltage</div>                                                                                                                                                      | <div></div> <div>S 1-2 Supply Voltage<br/>C B1-2 Control Voltage</div> |
| Operation Chart                                     | <div></div> <div><b>t on:</b> Turn on time &lt;= 30ms.<br/><b>t bp:</b> Minimum time between pulses, 30ms.<br/>t bp(1) &gt;= 30ms<br/>t bp(2) &lt; 30ms<br/><b>t p:</b> Trigger minimum length, 30ms (max. 99 hours)</div> |                                                                                                                                                           |
| Weight (g)                                          | 265                                                                                                                                                                                                                                                                                                          |                                                                                                                                                           |
| Dimensions (mm)                                     | (A) 42,5 x (B) 50,4 x (C) 96,6 (F large type)                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Coil characteristics                                |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Standard voltages <sup>(1)</sup>                    | 24, 48, 72, 96, 110, 125, 250 Vdc/Vac (50-60 Hz)                                                                                                                                                                                                                                                             |                                                                                                                                                           |
| Voltage range                                       | +25% -30% U <sub>N</sub> (except range 250)                                                                                                                                                                                                                                                                  |                                                                                                                                                           |
| Pick-up / release voltage                           | See power supply-temperature charts for impulse relay                                                                                                                                                                                                                                                        |                                                                                                                                                           |
| Average consumption in permanence (U <sub>N</sub> ) | 2,6 W                                                                                                                                                                                                                                                                                                        | 3,85 W                                                                                                                                                    |
| Operating time                                      |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Pick-up time                                        | < 23 ms                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
| Drop-out time                                       | < 40 ms                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
| Contacts                                            |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Contact type                                        | 2 Changeover                                                                                                                                                                                                                                                                                                 | 4 Changeover                                                                                                                                              |
| Contact material                                    | AgNi                                                                                                                                                                                                                                                                                                         |                                                                                                                                                           |
| Contacts resistance <sup>(2)</sup>                  | ≤ 15 mΩ                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
| Max. contacts resistance <sup>(4)</sup>             | 40 mΩ at 10 A                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Distance between contacts                           | 1,2 mm                                                                                                                                                                                                                                                                                                       |                                                                                                                                                           |
| Permanent current                                   | 10 A                                                                                                                                                                                                                                                                                                         |                                                                                                                                                           |
| Instantaneous current                               | 30 A during 1 s / 80 A during 200 ms / 200 A during 10 ms                                                                                                                                                                                                                                                    |                                                                                                                                                           |
| Wetting current/voltage                             | 12 Vdc, 10 mA                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Max. making capacity                                | 40 A, 0,5 s, 110 Vdc / 30A, 1 s, 36 Vdc, 30.000 operations (1 op/ 15 s)                                                                                                                                                                                                                                      |                                                                                                                                                           |
| Breaking capacity                                   | See breaking capacity curves (Contact configuration type B)                                                                                                                                                                                                                                                  |                                                                                                                                                           |
| Max. breaking capacity                              | See value for 50,000 operations                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| U <sub>max</sub> opened contact                     | 250 Vdc / 400 Vac                                                                                                                                                                                                                                                                                            |                                                                                                                                                           |
| General data                                        |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Mechanical endurance                                | 10 <sup>7</sup> operations                                                                                                                                                                                                                                                                                   |                                                                                                                                                           |
| Dielectric strength                                 | 2 kV (between independent circuits) / 1,5 kV (between open contacts)                                                                                                                                                                                                                                         |                                                                                                                                                           |
| Impulse voltage                                     | 5 kV (between independent circuits) / 2,5 kV (between open contacts)                                                                                                                                                                                                                                         |                                                                                                                                                           |
| Insulation resistance                               | >1000 GΩ                                                                                                                                                                                                                                                                                                     |                                                                                                                                                           |
| Operating temperature                               | Up to 125 Vdc: -40°C +70°C / 220 Vdc - 250 Vdc: -40°+55°C                                                                                                                                                                                                                                                    |                                                                                                                                                           |
| Storage temperature                                 | -40°C +85°C                                                                                                                                                                                                                                                                                                  |                                                                                                                                                           |
| Max. operating humidity                             | 93% / +40°C                                                                                                                                                                                                                                                                                                  |                                                                                                                                                           |
| Operating altitude <sup>(2)</sup>                   | <2000 m                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |

<sup>(1)</sup> Other voltages upon request

<sup>(2)</sup> Guarantee data for relays just manufactured

<sup>(3)</sup> Ask for higher altitudes

<sup>(4)</sup> At the end of working life

# BREAKING CAPACITY



› With devices operating worldwide, also heavy industries like oil & gas sector trust in our relays.

# BREAKING CAPACITY

The breaking capacity is a critical parameter on the design and the application of the relay. Its mechanical life could be considerably reduced, depending on the value of the load (especially with heavy duty loads), the number of operations and the environmental conditions in which the relay is operating.

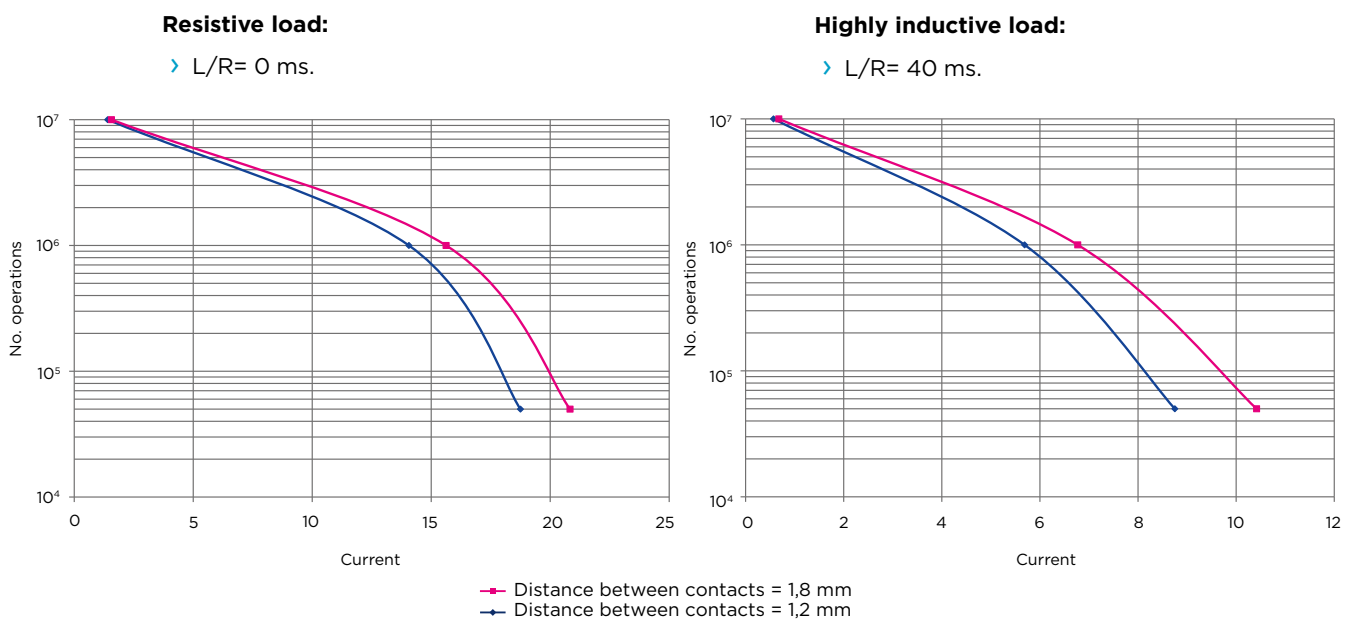
In any configuration, ARTECHE's auxiliary relays have high breaking capacity values. These limits are shown in the table below, in terms of power and current values. In all cases, these relays guarantee the correct performance during 50,000 operations.

Likewise, the values shown in the following charts have been obtained in standard conditions in the laboratory, and they could be different in real conditions. In any case, the possibility of connecting serial contacts or a bigger distance between contacts makes these values to be considerably increased.

## INSTANTANEOUS, LATCHING, TIMERS AND PULSE RELAYS

### 24 Vdc voltage

Different load configurations.



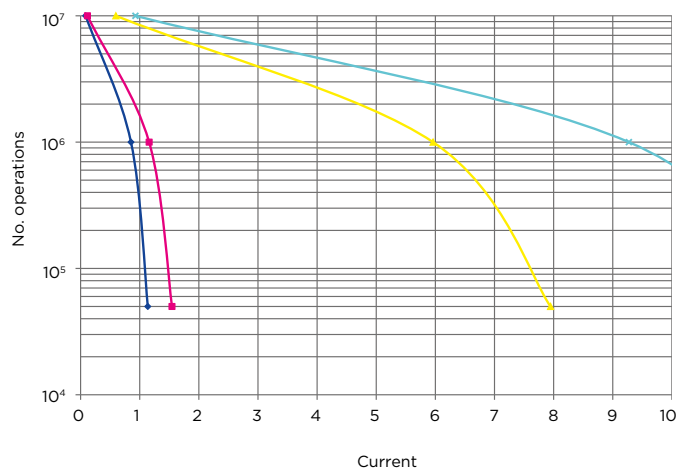
|     |                                    | 0 ms |       | 20 ms |       | 40 ms |       |
|-----|------------------------------------|------|-------|-------|-------|-------|-------|
| Vdc | Contact configuration              | P(W) | I(A)  | P(W)  | I(A)  | P(W)  | I(A)  |
| 24  | Distance between contacts = 1,8 mm | 500  | 20,83 | 370   | 15,42 | 250   | 10,42 |
|     | Distance between contacts = 1,2 mm | 450  | 18,75 | 300   | 12,50 | 210   | 8,75  |

## 110 Vdc voltage

### Different load configurations.

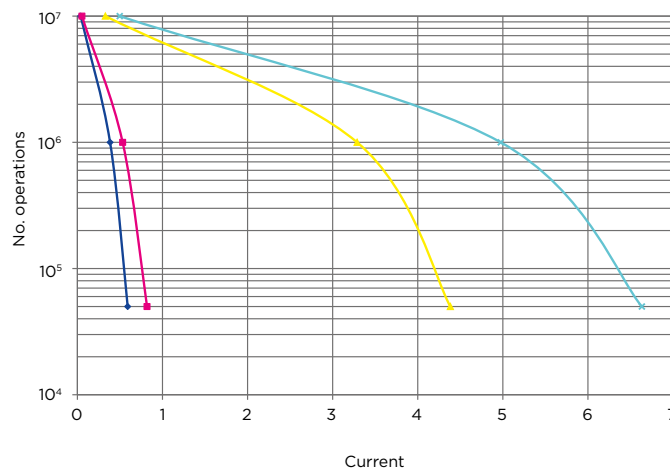
#### Resistive load:

›  $L/R = 0$  ms.



#### Highly inductive load:

›  $L/R = 40$  ms.



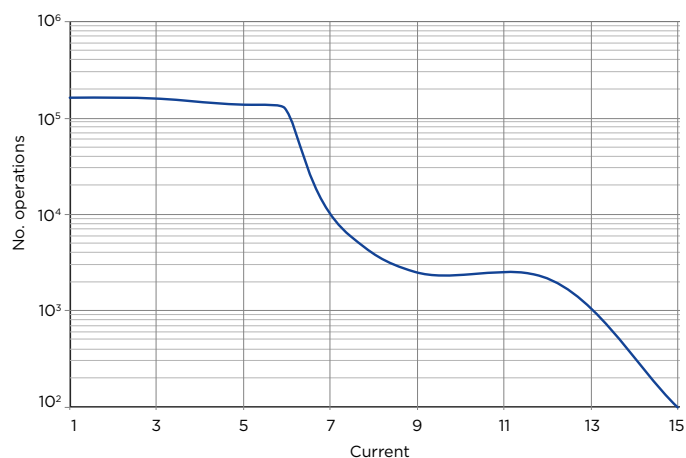
— Distance between contacts = 1,8 mm  
 — Distance between contacts = 1,2 mm  
 — 2 contacts in series. Distance between contacts = 1,8 mm  
 — 2 contacts in series. Distance between contacts = 1,2 mm

| Vdc | Contact configuration                                    | 0 ms  |       | 20 ms |       | 40 ms |      |
|-----|----------------------------------------------------------|-------|-------|-------|-------|-------|------|
|     |                                                          | P(W)  | I(A)  | P(W)  | I(A)  | P(W)  | I(A) |
| 110 | Distance between contacts = 1,8 mm                       | 170   | 1,55  | 140   | 1,27  | 90    | 0,82 |
|     | Distance between contacts = 1,2 mm                       | 125   | 1,14  | 100   | 0,91  | 65    | 0,59 |
|     | 2 contacts in series. Distance between contacts = 1,8 mm | 1.360 | 12,36 | 1.106 | 10,05 | 730   | 6,63 |
|     | 2 contacts in series. Distance between contacts = 1,2 mm | 874   | 7,95  | 742   | 6,74  | 482   | 4,38 |

## CONTACTORS

### 110 Vdc Voltage

›  $L/R = 40$  ms.



## HOW TO SELECT THE CURVE OF MY RELAY

These charts show the breaking capacity values, either for resistive and highly inductive loads, in three voltage values of reference (ask for other voltage values). The charts show two different curves:

- › Pink Curve: Breaking capacity of the relays with distance between contacts = 1.8 mm.
- › Blue Curve: Breaking capacity of the relays with distance between contacts = 1.2 mm.

The distance between contacts is shown in the tables of technical data.



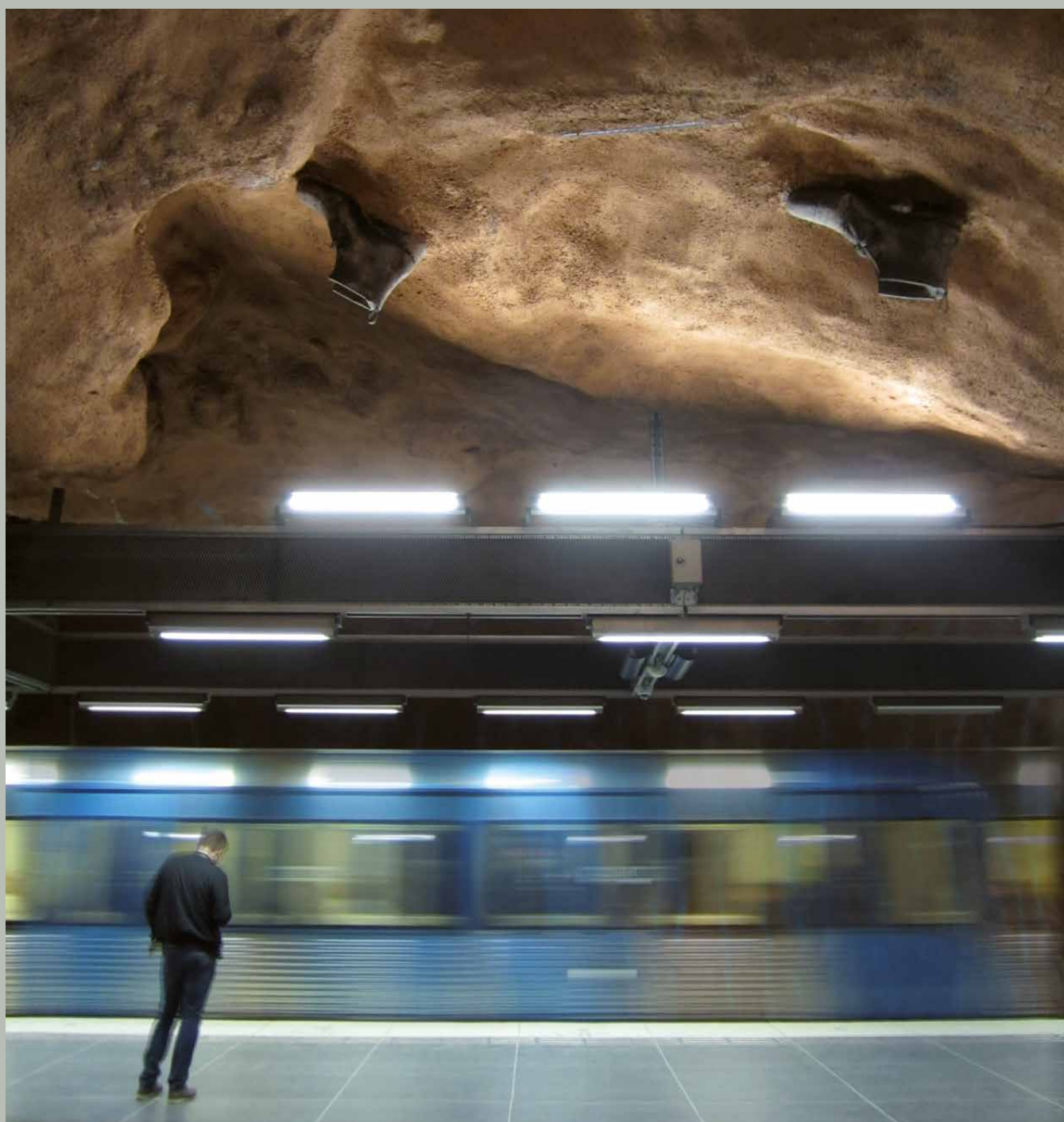
## HOW THE BREAKING CAPACITY CAN BE INCREASED

Although ARTECHE auxiliary relays are power relays, designed to have a high breaking capacity, there are applications where the loads are so high that it is necessary to even increase the breaking capacity, keeping the reliability of the contacts of the auxiliary relays.

Thus, ARTECHE relays offer the possibility of connecting 2 or more contacts in series giving an important increase of breaking capacity, guaranteeing the right performance during a high number of operations.

The breaking capacity obtained is shown in the breaking capacity charts with yellow and light blue colours.

# PICK-UP VOLTAGE/RELEASE VOLTAGE-TEMPERATURE CHARTS

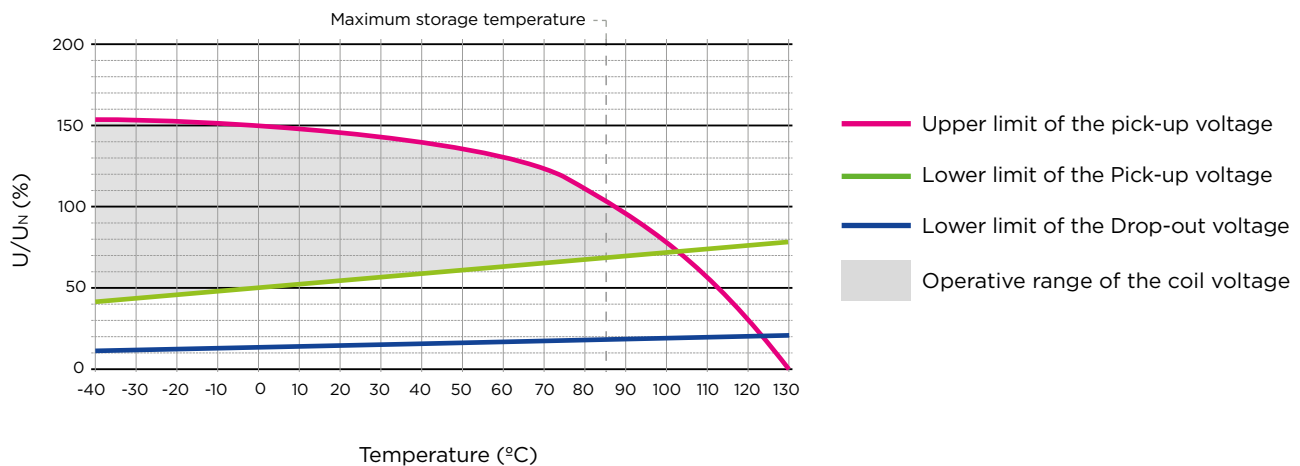


# INSTANTANEOUS RELAYS AND CONTACTORS

Variability of operative voltage range against temperature for the instantaneous auxiliary relays.

## INSTANTANEOUS RELAYS WITH AND WITHOUT COIL OVERVOLTAGE PROTECTION AND CONTACTORS

**Operative range against ambient temperature.**

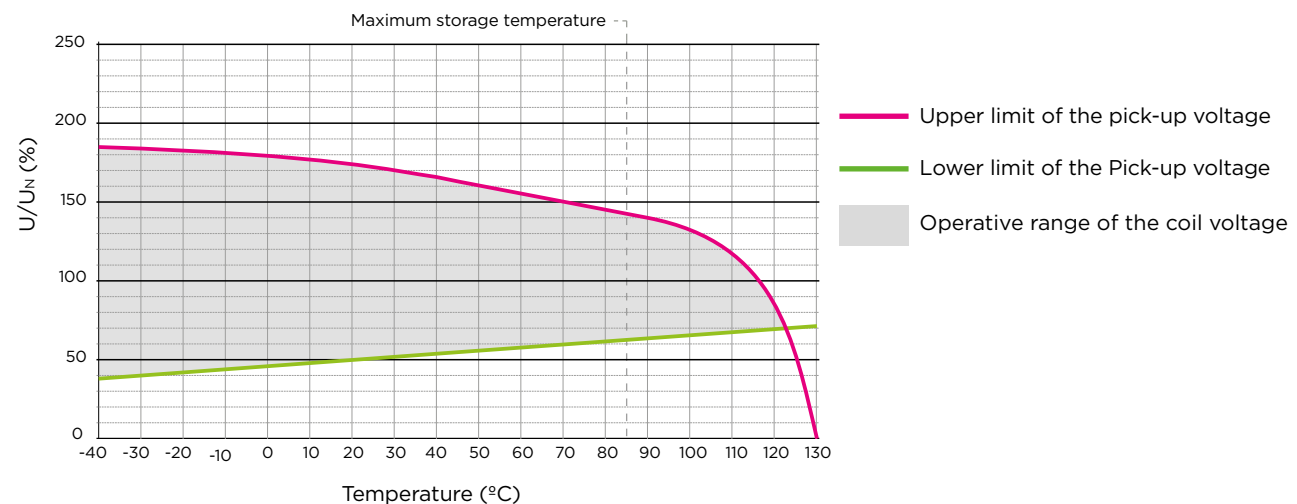


## LATCHING RELAYS

The following curve shows the variability of operative voltage range against temperature for the Latching relays.

## GENERAL PURPOSE LATCHING RELAYS AND LATCHING RELAYS WITH COIL OVERVOLTAGE PROTECTION

**Operative range against ambient temperature.**

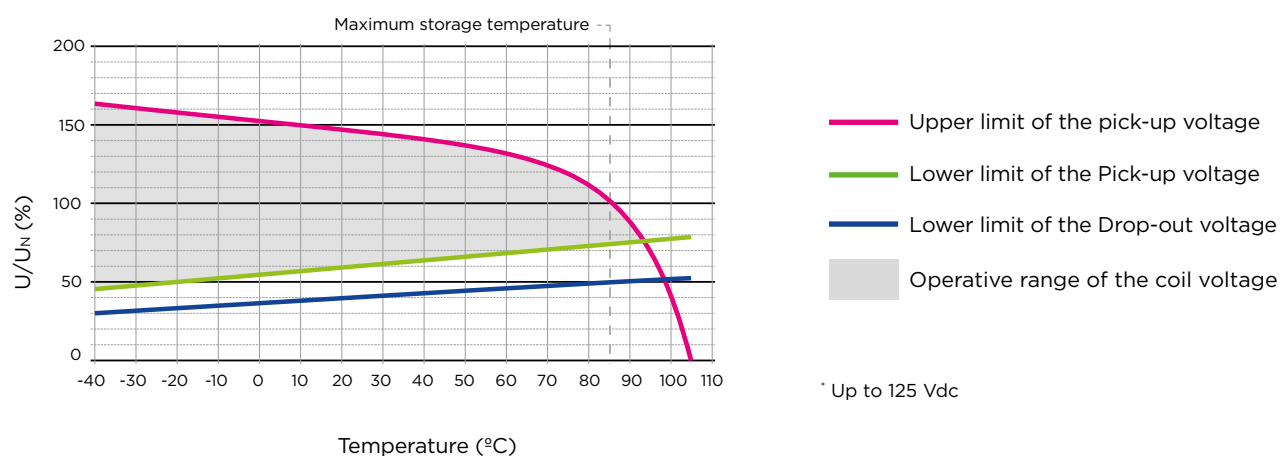


# TIME-LAG RELAYS AND IMPULSE RELAY

The following curve shows the variability of operative voltage range against temperature for the time-lag relays.

## TIME-LAG RELAYS AND IMPULSE RELAY

**\*Operative range against ambient temperature.**



# MODEL SELECTION

| Instantaneous<br>2 contacts                                 |                      | Type | Range | Aux. Supply<br>Vdc or Vac | Options |   |   |   |   |                |
|-------------------------------------------------------------|----------------------|------|-------|---------------------------|---------|---|---|---|---|----------------|
| Model Selection                                             | RD-2SY               |      |       | OP                        | 0       |   |   |   |   | FF             |
| General purpose range                                       | RD-2SY               |      |       |                           | 0*      | 0 | 0 | 0 | 0 | Standard model |
| 2 contacts relay                                            |                      |      |       |                           |         |   |   |   |   |                |
| With coil overvoltage protection range                      |                      |      |       |                           |         |   |   |   |   |                |
| Diode in parallel with the coil (only Vdc)                  | DI                   |      |       |                           | 0*      | 0 | 0 | 0 | 0 |                |
| Varistance in parallel with the coil                        | V                    |      |       |                           | 0*      | 0 | 0 | 0 | 0 |                |
| Aux. Supply Vdc or Vac                                      |                      |      |       |                           |         |   |   |   |   |                |
| Indicate voltage level and if it is VDC or VAC (ex: 24 VDC) |                      |      |       |                           |         |   |   |   |   |                |
| Options                                                     |                      |      |       |                           |         |   |   |   |   |                |
| Front LED                                                   | No                   |      |       |                           |         | 0 |   |   |   |                |
|                                                             | Yes                  |      |       |                           |         | 1 |   |   |   |                |
| Mechanical contact position indicator                       | No                   |      |       |                           |         |   | 0 |   |   |                |
|                                                             | Yes                  |      |       |                           |         |   | 1 |   |   |                |
| Push to test button                                         | No                   |      |       |                           |         |   |   |   |   | 0              |
|                                                             | To push the contacts |      |       |                           |         |   |   |   |   | 1              |

\*Mandatory option

# MODEL SELECTION

| Instantaneous<br>4-8 contacts                               |                      | Type | Range | Aux. Supply<br>Vdc or Vac | Options |    |   |   |   |    |
|-------------------------------------------------------------|----------------------|------|-------|---------------------------|---------|----|---|---|---|----|
| <b>Model Selection</b> ▶▶                                   |                      |      |       |                           | OP      | 0  |   |   |   | FF |
| General purpose range                                       |                      |      |       |                           |         |    |   |   |   |    |
| 4 contacts relay                                            | RF-4SY               |      |       |                           |         | O* | 0 | 0 | 0 | 1  |
| 8 contacts relay                                            | RJ-8SY               |      |       |                           |         | O* | 0 | 0 | 0 | 1  |
| With coil overvoltage protection range                      |                      |      |       |                           |         |    |   |   |   |    |
| Diode in parallel with the coil (only Vdc)                  |                      | DI   |       |                           |         | O* | 0 | 0 | 0 | 1  |
| Varistance in parallel with the coil                        |                      | V    |       |                           |         | O* | 0 | 0 | 0 | 1  |
| Aux. Supply Vdc or Vac                                      |                      |      |       |                           |         |    |   |   |   |    |
| Indicate voltage level and if it is VDC or VAC (ex: 24 VDC) |                      |      |       |                           |         |    |   |   |   |    |
| Options                                                     |                      |      |       |                           |         |    |   |   |   |    |
| Front LED                                                   | No                   |      |       |                           |         |    | 0 |   |   |    |
|                                                             | Yes                  |      |       |                           |         |    | 1 |   |   |    |
| Mechanical contact position indicator                       | No                   |      |       |                           |         |    |   | 0 |   |    |
|                                                             | Yes                  |      |       |                           |         |    |   | 1 |   |    |
| Push to test button                                         | No                   |      |       |                           |         |    |   |   |   | 0  |
|                                                             | To push the contacts |      |       |                           |         |    |   |   |   | 1  |

\*Mandatory option

| Latching                                                    |      | Type | Range | Aux. Supply<br>Vdc or Vac |
|-------------------------------------------------------------|------|------|-------|---------------------------|
| <b>Model Selection</b> ▶▶                                   |      |      |       | FF                        |
| General purpose range                                       |      |      |       |                           |
| 3 contacts relay                                            | BF-3 |      |       |                           |
| 4 contacts relay                                            | BF-4 |      |       |                           |
| 8 contacts relay                                            | BJ-8 |      |       |                           |
| Options                                                     |      |      |       |                           |
| Diode in parallel with the coil (only Vdc)                  |      | BB   |       |                           |
| Aux. Supply Vdc or Vac                                      |      |      |       |                           |
| Indicate voltage level and if it is VDC or VAC (ex: 24 VDC) |      |      |       |                           |

| Timers                                                 |        | Type                                                                       | Aux. Supply   |    | Options |   |    |                |
|--------------------------------------------------------|--------|----------------------------------------------------------------------------|---------------|----|---------|---|----|----------------|
| Model Selection                                        | ▶▶     |                                                                            |               | OP | 0       |   | 0  | FF             |
| General purpose range                                  |        |                                                                            |               |    |         |   |    |                |
| Relay with 2 timer contacts                            | TDF-2  |                                                                            |               |    | 0*      | 0 | 0* | Standard model |
| Relay with 4 timer contacts                            | TDF-4  |                                                                            |               |    | 0*      | 0 | 0* |                |
| Relay with 2 instantaneous contacts + 2 timer contacts | TDF-22 |                                                                            |               |    | 0*      | 0 | 0* |                |
| Relay with 8 timer contacts                            | TDJ-8  |                                                                            |               |    | 0*      | 0 | 0* |                |
| Relay with 4 instantaneous contacts + 4 timer contacts | TDJ-44 |                                                                            |               |    | 0*      | 0 | 0* |                |
| Aux. Supply                                            |        |                                                                            |               |    |         |   |    |                |
| Indicate voltage level (ex.: 24Vdc/Vac)                |        |                                                                            |               |    |         |   |    |                |
| Options                                                |        |                                                                            |               |    |         |   |    |                |
|                                                        |        |                                                                            |               |    |         |   |    |                |
|                                                        |        |                                                                            |               |    |         |   |    |                |
|                                                        |        | Dependent Standard                                                         |               |    |         | 0 |    |                |
|                                                        |        |                                                                            | 24 Vdc • Vac  |    |         | 1 |    |                |
|                                                        |        |                                                                            | 48 Vdc • Vac  |    |         | 2 |    |                |
|                                                        |        |                                                                            | 60 Vdc • Vac  |    |         | 3 |    |                |
|                                                        |        | Independent Different voltages for the command signal and the power supply | 72 Vdc • Vac  |    |         | 4 |    |                |
|                                                        |        |                                                                            | 96 Vdc • Vac  |    |         | 5 |    |                |
|                                                        |        |                                                                            | 110 Vdc • Vac |    |         | 6 |    |                |
|                                                        |        |                                                                            | 125 Vdc • Vac |    |         | 7 |    |                |
|                                                        |        |                                                                            | 220 Vdc • Vac |    |         | 8 |    |                |

(\*) Mandatory option

| Timers (pick up time)                                                                                                                                                                            | type    | Timer time | Range | Aux. supply Vdc o Vac |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------|-------|-----------------------|
| <b>Model selection</b> ▶▶                                                                                                                                                                        |         |            |       | FF                    |
| Contactor type                                                                                                                                                                                   |         |            |       |                       |
| Relay with 4 timer contacts                                                                                                                                                                      | TDF-4DO |            |       |                       |
| Timer                                                                                                                                                                                            |         |            |       |                       |
| Fixed: between 0 and 1000 ms<br>*Except for 72 VDC that would be between 0-800 ms                                                                                                                |         | F          | XXXM  |                       |
| Variable (with potentiometer:):<br>0-500 ms<br>100-600 ms<br>200-700 ms* (limit of coil 72VDC)<br>300-800 ms<br>400-900 ms<br>500-1000 ms<br>and intermediate combinations, with steps up 500 ms |         |            | YYM   |                       |
| Aux. supply Vdc                                                                                                                                                                                  |         |            |       |                       |
| Indicate voltage level (ex:24 Vdc)                                                                                                                                                               |         |            |       |                       |

XXXM: Indicate the fixed time selected from 0 to 1000 ms

YYM: Indicate the upper limit of the selected range

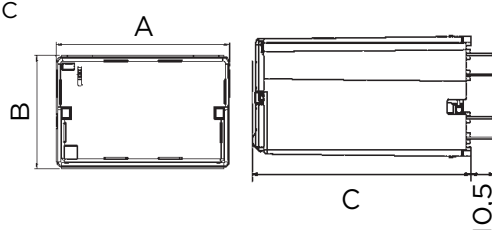
| Contactors (Timers)                                        |           | Type | Aux. Supply Vdc/Vac |  | OP | FF             |
|------------------------------------------------------------|-----------|------|---------------------|--|----|----------------|
| Model Selection                                            | ►►        | ▲    | ▲                   |  |    |                |
| General purpose range                                      |           |      |                     |  |    |                |
| Contactor with 2 timer contacts                            | CTF-2     |      |                     |  | 0  | Standard model |
| Contactor with 4 timer contacts                            | CTF-4     |      |                     |  | 0  |                |
| Contactor with 2 instantaneous contacts + 2 timer contacts | CTF-22    |      |                     |  | 0  |                |
| Contactor with 8 timer contacts                            | CTJ-8     |      |                     |  | 0  |                |
| Contactor with 4 instantaneous contacts + 4 timer contacts | CTJ-44    |      |                     |  | 0  |                |
| Aux. Supply Vdc                                            |           |      |                     |  |    |                |
| Indicate voltage level (ex:24 Vdc)                         |           |      |                     |  |    |                |
| Options                                                    |           |      |                     |  |    |                |
|                                                            | Dependent |      |                     |  | 0  |                |
|                                                            | Standard  |      |                     |  |    |                |
|                                                            |           |      | 24 Vdc • Vac        |  | 1  |                |
|                                                            |           |      | 48 Vdc • Vac        |  | 2  |                |
|                                                            |           |      | 60 Vdc • Vac        |  | 3  |                |
|                                                            |           |      | 72 Vdc • Vac        |  | 4  |                |
|                                                            |           |      | 96 Vdc • Vac        |  | 5  |                |
|                                                            |           |      | 110 Vdc • Vac       |  | 6  |                |
|                                                            |           |      | 125 Vdc • Vac       |  | 7  |                |
|                                                            |           |      | 220 Vdc • Vac       |  | 8  |                |

| Contactors (Instantaneous)             |      | Type | Range | Aux. Supply Vdc | FF |
|----------------------------------------|------|------|-------|-----------------|----|
| Model Selection                        | ►►   | ▲    | ▲     | ▲               |    |
| General purpose range                  |      |      |       |                 |    |
| 2 contacts contactor                   | CD-2 |      |       |                 |    |
| 4 contacts contactor                   | CF-4 |      |       |                 |    |
| 8 contacts contactor                   | CJ-8 |      |       |                 |    |
| With coil overvoltage protection range |      |      |       |                 |    |
| Diode in parallel with the coil        |      |      | DI    |                 |    |
| Varistance in parallel with the coil   |      |      | V     |                 |    |
| Aux. Supply Vdc                        |      |      |       |                 |    |
| Indicate voltage level (ex:24 Vdc)     |      |      |       |                 |    |

| Impulse relay                               |       | Type | Aux. supply Vdc or Vac | FF |
|---------------------------------------------|-------|------|------------------------|----|
| Model selection                             | ►►    | ▲    | ▲                      |    |
| Relay type                                  |       |      |                        |    |
| 2 contacts contactor                        | RBF-2 |      |                        |    |
| 4 contacts contactor                        | RBF-4 |      |                        |    |
| Aux. supply Vdc or Vac                      |       |      |                        |    |
| Indicate voltage level VAC VDC (ex.: 24Vdc) |       |      |                        |    |

## DIMENSIONS OF THE RELAYS

› Dimensions: A x B x C



## RETAINING CLIPS

The use of retaining clips should be mandatory on rolling stocks to prevent the relay to get out of its socket by vibration.

The best choice thereof depends on the combination of relay and socket.

| RETAINING CLIPS | OP SOCKET                                                                           | RELATED PLUGGED RELAY                                                               |
|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| E0              | Universal (D and F sized sockets require 2 units ; J sized sockets require 4 units) | RD; RF; RJ; TDF; TDJ<br>Universal (Bag of 20 units)<br>Universal (Bag of 100 units) |
| E41             | DN-DE IP FF, DN-DE 2C IP FF                                                         | RD OP FF                                                                            |
| E50             | DN-TR OP, DN-TR 2C OP FF                                                            | RD OP FF                                                                            |
| E40             | FN-DE IP, FN-DE 2C IP FF                                                            | RF OP FF                                                                            |
| E43             | FN-DE IP, FN-DE 2C IP FF                                                            | TDF OP; RBF FF                                                                      |
| E42             | FN-TR OP, FN-TR 2C OP FF                                                            | RF OP FF                                                                            |
| E44             | FN-TR OP, FN-TR 2C OP FF                                                            | TDF OP; RBF FF                                                                      |
| E31             | FN-DE IP, FN-DE 2C IP FF                                                            | BF FF                                                                               |
| E21             | FN-TR OP, FN-TR 2C OP FF                                                            | BF FF                                                                               |
| E45             | JN-DE IP, JN-DE 2C IP FF                                                            | RJ OP FF                                                                            |
| E47             | JN-DE IP, JN-DE 2C IP FF                                                            | TDJ OP FF                                                                           |
| E46             | JN-TR OP, JN-TR 2C OP FF                                                            | RJ OP FF                                                                            |
| E48             | JN-TR OP, JN-TR 2C OP FF                                                            | TDJ OP FF                                                                           |
| E29             | JN-DE IP, JN-DE 2C IP FF                                                            | BJ; UJ FF                                                                           |
| E27             | JN-TR OP, JN-TR 2C OP FF                                                            | BJ; UJ FF                                                                           |

### OTHER ACCESSORIES

Security pins for RD; RF; RJ; TDF; TDJ relays (bag of 100 units)



› E0 retaining clips



› E\*\* retaining clips

## SOCKETS, DIMENSIONS AND CUT-OUT

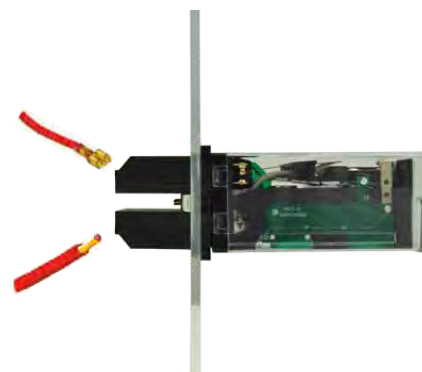
| Sockets |                       | Accessories   |                 |                 | weight (g) | Accessories                           |
|---------|-----------------------|---------------|-----------------|-----------------|------------|---------------------------------------|
| Relay   | Type                  | Screw         | Double faston   | Clamp           |            |                                       |
| D       | IP10 Front connection | DN-DE IP10 FF | DN-DE2C IP10 FF |                 | 60         | Retaining clips                       |
|         | IP20 Front connection | DN-DE IP20 FF | DN-DE2C IP20 FF |                 | 60         | Function signs on the extraction ring |
|         | IP20 Rear connection  | DN-TR OP FF   | DN-TR2C OP FF   |                 | 50         | Security pins (*)                     |
| F       | IP10 Front connection | FN-DE IP10 FF | FN-DE2C IP10 FF |                 | 110        |                                       |
|         | IP20 Front connection | FN-DE IP20 FF | FN-DE2C IP20 FF | F DE CL IP20 FF | 110        |                                       |
|         | IP20 Rear connection  | FN-TR OP FF   | FN-TR2C OP FF   |                 | 90         |                                       |
| J       | IP10 Front connection | JN-DE IP10 FF | JN-DE2C IP10 FF |                 | 225        | (*) Not available for latching relays |
|         | IP20 Front connection | JN-DE IP20 FF | JN-DE2C IP20 FF |                 | 225        |                                       |
|         | IP20 Rear connection  | JN-TR OP FF   | JN-TR2C OP FF   |                 | 180        |                                       |



› Front connection socket

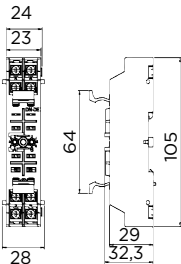
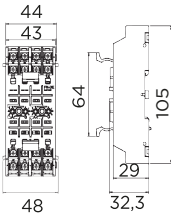
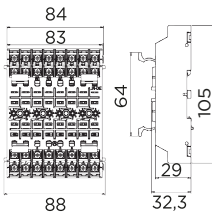
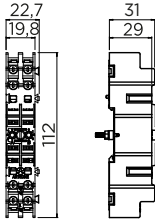
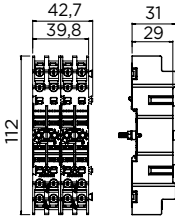
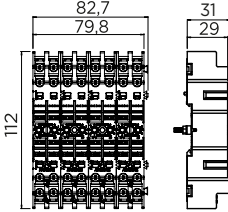
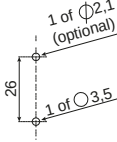
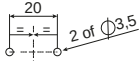
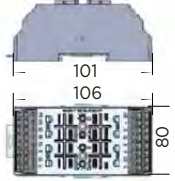
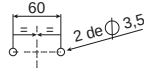
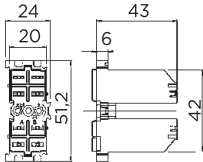
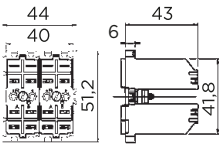
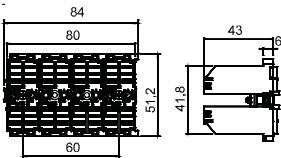
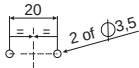
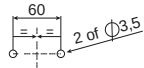
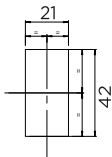
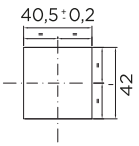
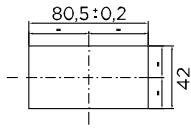
Front connection for double faston IP10 sockets

DN-DE2C IP10  
FN-DE2C IP10  
JN-DE2C IP10



› Rear connection socket

lateral connection for the rest of the sockets

| Sockets for DIN rail<br>(1) (2) | Relays type D                                                                                                                | Relays type F                                                                                                                                                                                               | Relays type J                                                                                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|                                 | DN-DE IP10 FF • DN-DE2C IP10 FF<br>         | FN-DE IP10 FF • FN-DE2C IP10 FF<br>                                                                                        | JN-DE IP10 FF • JN-DE2C IP10 FF<br>         |
|                                 | DN-DE IP20 FF • DN-DE2C IP20 FF<br>         | FN-DE IP20 FF • FN-DE2C IP20 FF<br>                                                                                        | JN-DE IP20 FF • JN-DE2C IP20 FF<br>         |
|                                 | Fix Drilling<br>                           | Fix Drilling<br><br>F DE CL IP20 FF<br> | Fix Drilling<br>                           |
| Sockets for rear connection     | DN-TR IP10 OP FF • DN-TR2C IP10 OP FF<br> | FN-TR IP10 OP FF • FN-TR2C IP10 OP FF<br>                                                                                | JN-TR IP10 OP FF • JN-TR2C IP10 OP FF<br> |
|                                 | Fix Drilling<br>                          | Fix Drilling<br>                                                                                                         | Fix Drilling<br>                         |
| Cut-Out                         |                                           |                                                                                                                          |                                           |

<sup>(1)</sup> DIN rail according to EN50022 DIN46277/3

<sup>(2)</sup> Minimum distance between sockets will depend on type of relay and sockets. Please request sockets user manual for more detailed information.



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Moving together



Updates: ARTECHE\_CT\_Auxiliary-Relays-Railway Sector\_EN  
Version: 2.1