Time-Lag Relays

User´s Handbook (General Model)

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Chapter 1. Object

This manual is intended to help users to operate the time-lag relays.

Chapter 2. Range

The new range of time-lag relays comprises the following models:

- → **TDF-2, RBF-2**: Time-lag relay with 2 timer contacts.

- → **CTF-2:** Time-lag relay with 2 timer contacts. **High breaking capacity.**

- → **TDF-22**: Time-lag relay with 2 timer contacts and 2 instantaneous contacts.

- → **TDF-4, TDF-4DO, RBF-4**: Time-lag relay with 4 timer contacts.

- → **CTF-4:** Time-lag relay with 4 timer contacts. **High breaking capacity.**

- → **TDJ-44**: Time-lag relay with 4 timer contacts and 4 instantaneous contacts.

- → **TDJ-8**: Time-lag relay with 8 timer contacts.

- → **CTJ-8:** Time-lag relay with 8 timer contacts. **High breaking capacity.**

Chapter 3. Operating principles

The new Arteche multifunction time-lag relays range, include multiple timing functions. Furthermore, these relays stand out by its wide range of timings, as well as, by the simplicity of the operation. All the relay rated voltages work indistinctly both with direct or alternating current and the operation range is +25% / -30% of the nominal voltage (UN), except the one of 220 that has a range of +10% / -20%. These voltage ranges are for both auxiliary voltage and command voltage.

Chapter 4. Reception & storage

The time-lag relays are supplied with packaging capable of protecting them during normal handling for equipment of this type.

If they are not to be installed immediately, they should be kept in the packaging, properly closed and in indoor conditions, protected from rain, dust, vibration, etc.

If the packaging is damaged or it is believed that the unit may have been incorrectly handled in transit, the carrier, the relevant insurance company and the manufacturing plant should be informed forthwith.

Check also that the data on the ID plate matches the order data.

Chapter 5. External connections diagram

5.1. Size F time-lag relays.

In a **TDF-2:**

→ The terminals 2-1 are for the auxiliary supply of the relay.

→ If the command voltage is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal 1) and the control signal will be A1. In the case of independent command voltage, the terminals A1-B1 will be the relay command signal or external control.

→ The 5-9-13 and 6-10-14 are timer contacts.
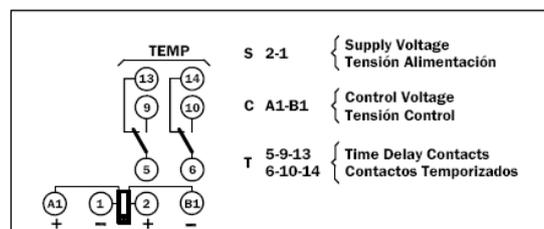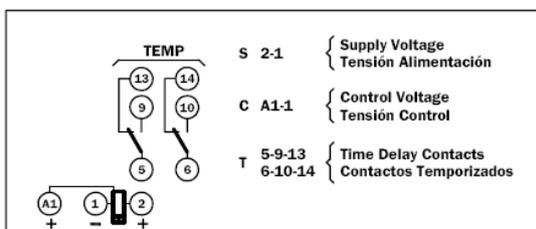
In a CTF-2:

→ The terminals 2-1 are for the auxiliary supply of the relay.

→ If the command voltage is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal 1) and the control signal will be A1. In the case of independent command voltage, the terminals A1-B1 will be the relay command signal or external control.

→ The 5-9-13 and 6-10-14 are timer contacts.

→ **The 5-9 and 6-10 contacts are high breaking capacity contacts.**

In a **TDF-22:**

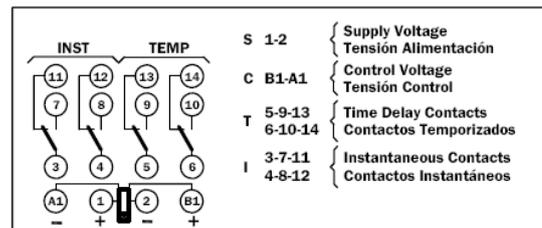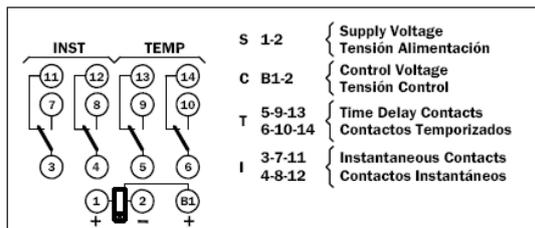→ The terminals 1-2 are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal 2) and the control signal will be B1. In the case of independent command the terminals B1-A1 will be the relay command signal or external control.

→ The 5-9-13 and 6-10-14 are timer contacts.

→ The contacts 3-7-11 and 4-8-12 are instantaneous (operating time lower than 20 ms).

In a **TDF-4:**

→ The terminals 1-2 are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal 2) and the control signal will be B1. In the case of independent command the terminals B1-A1 will be the relay command signal or external control.

→ The 3-7-11, 4-8-12, 5-9-13 and 6-10-14 are timer contacts.

In a **CTF-4:**

→ The terminals 1-2 are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal 2) and the control signal will be B1. In the case of independent command the terminals B1-A1 will be the relay command signal or external control.

→ The 3-7-11, 4-8-12, 5-9-13 and 6-10-14 are timer contacts.

→ **The 3-7, 4-8, 5-9, y 6-10 contacts are high breaking capacity contacts.**

In a **TDF-4DO**:

→ The terminals 1-2 are for the auxiliary supply of the relay.

→ The 3-7-11, 4-8-12, 5-9-13 and 6-10-14 are timer contacts.

In a **RBF-2**:

→ The terminals 1-2 are for the auxiliary supply of the relay.

→ The 5-9-13 and 6-10-14 are timer contacts.
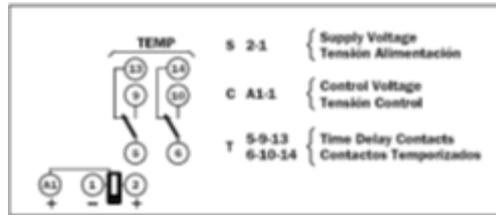
In a **RBF-4**:

→ The terminals 1-2 are for the auxiliary supply of the relay.

→ The 3-7-11, 4-8-12, 5-9-13 and 6-10-14 are timer contacts.
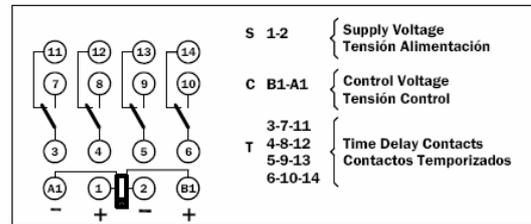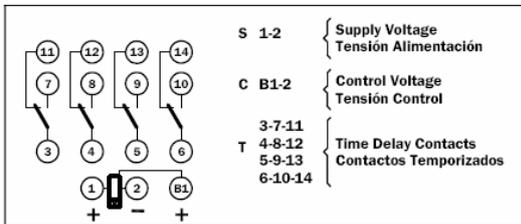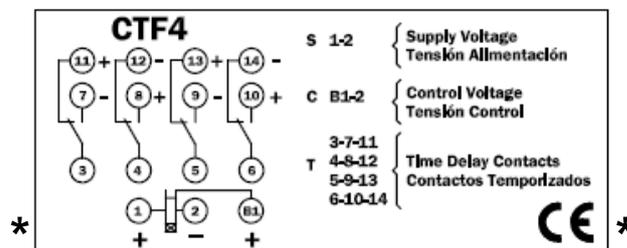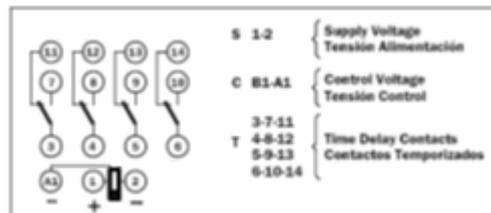

5.2. Size J time-lag relays.

In a **TDJ-44:**

→ The terminals D-A are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal A) and the control signal will be B. In the case of independent command the terminals B-C will be the relay command signal or external control.

→ The 4-40-41, 3-30-31, 2-20-21 and 1-10-11 are timer contacts.

→ The contacts 8-80-81, 7-70-71, 6-60-61 and 5-50-51 are instantaneous (operating time lower than 20 ms).
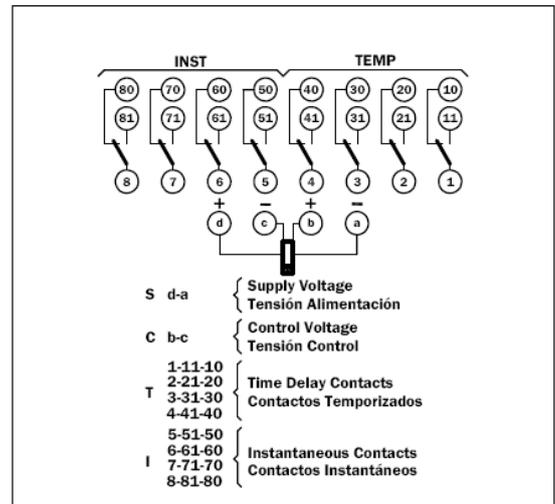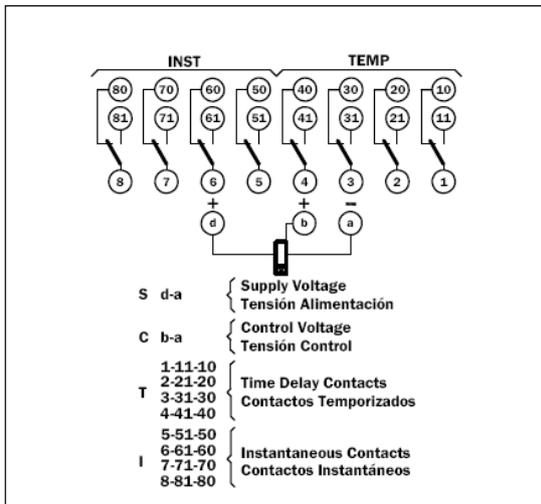
In a **TDJ-8:**

→ The terminals d-a are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal A) and the control signal will be B. In the case of independent command the terminals B-C will be the relay command signal or external control.

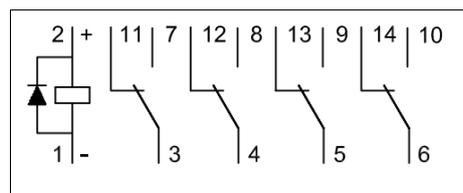→ The 8-80-81, 7-70-71, 6-60-61, 5-50-51, 4-40-41, 3-30-31, 2-20-21 and 1-10-11 are timer contacts.
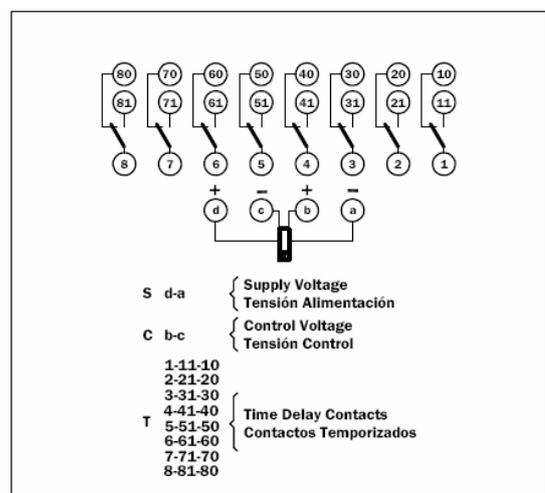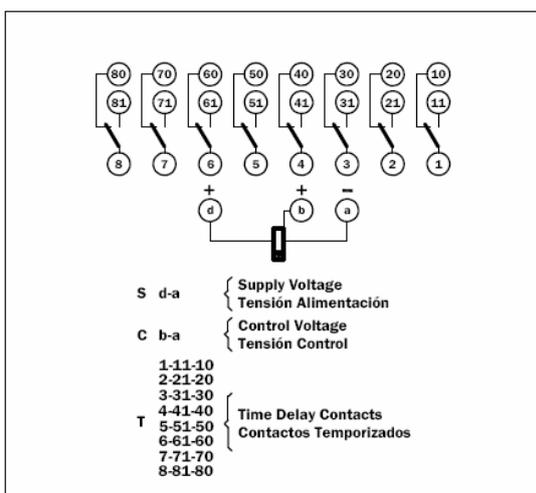
In a CTJ-8:

→ The terminals d-a are for the auxiliary supply of the relay.

→ If the command is dependent, the negative of the same will be shared with the negative of the auxiliary supply (terminal A) and the control signal will be B. In the case of independent command the terminals B-C will be the relay command signal or external control.

→ The 8-80-81, 7-70-71, 6-60-61, 5-50-51, 4-40-41, 3-30-31, 2-20-21 and 1-10-11 are timer contacts.

→ **The 8-81, 7-71, 6-61, 5-51, 4-41, 3-31, 2-21 and 1-10 contacts are high breaking capacity contacts.**
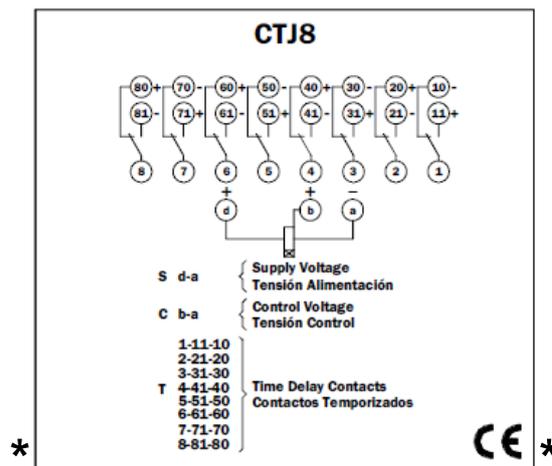
Chapter 6. FUNCTIONAL CHARACTERISTICS

6.1. Timing

To choose the desired timing, the relays have 3 selectors available on the front part: in each of them the position of the point of the arrow indicates the option number selected. All the selectors are of discreet step not continuous, and for this reason the arrow cannot stay in an intermediate position.
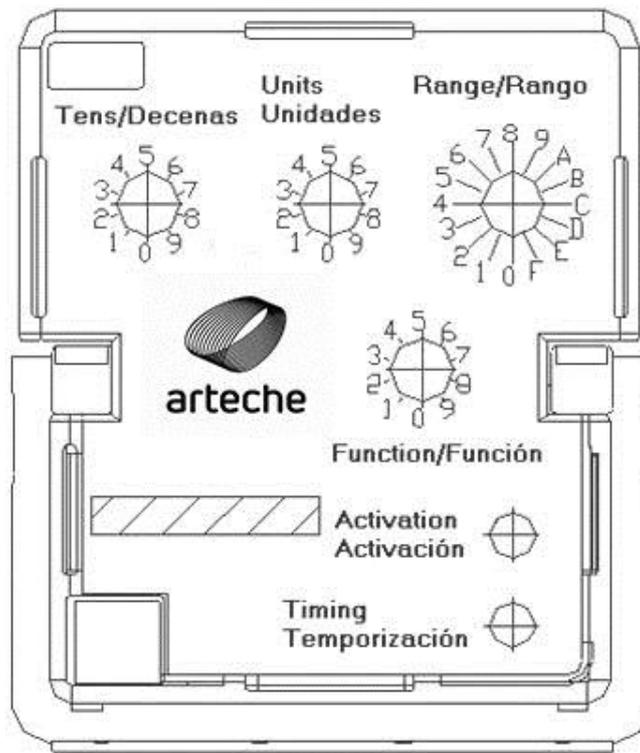
The 16 position selector with the indication "Range", on top right part, allows to choose between the different 16 time ranges available. Each of the ranges is determined by a low limit and a top limit, as well as, by a step, as it is shown in the following table. This same table is printed on the left side of the relay.

Range	Low limit	Top limit	Step	Range	Low limit	Top limit	Step
0	30ms	990ms	10ms	8	10s	990s	10s
1	30ms	2,97s	30ms	9	0,5min	49,5min	0,5min
2	0,1s	9,9s	100ms	A	1min	99min	1min
3	0,2s	19,8s	200ms	B	3min	297min	3min
4	0,5s	49,5s	0,5s	C	5min	495min	5min
5	1s	99s	1s	D	10min	990min	10min
6	3s	297s	3s	E	0,5h	49,5h	0,5h
7	5s	495s	5s	F	1h	99h	1h

On the following example, the chosen range would be the 5, which low limit is 1 second and the top is 99 seconds, with a step of 1 second.
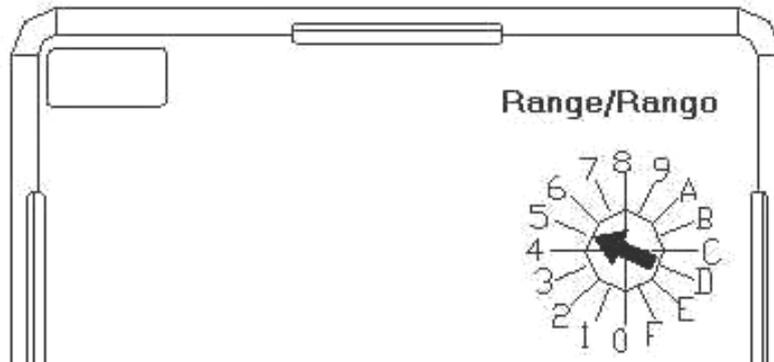
The combination of the two 10 position selectors, placed on the left side of the "Range" selector, allows selecting a number between 1 and 99. The number selected on the selector "Tens" multiplied by 10, plus the number selected on the selector "Unit" will be the chosen number. Once the range is selected, this number is the times that the step is going be multiplied, in order to choose this way the time on which the relay will operate.

This way, on the following example:
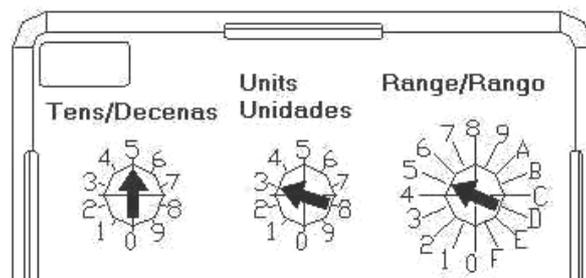
The range that has been chosen is the 5, which step is 1 second. As the tens selector is on the position 5 (5*10=50) and the unit one is on the 3 (50+3=53), the relay will temporize 53 times the step, in other words, it will temporize 53 x 1 = 53 seconds.

NOTE 1: *If the tens selector is placed on the 0 and the unit one on the 0 or on the 1, the relay temporizes the step of the selected range.*

NOTE 2: *As the relay cannot temporize less than 30 milliseconds, if by the selectors it is chosen an option that would suppose a timing lower than this value, the relay will temporize 30ms. (for example, if it is selected the range 0, tens 0, and units 1 or 2, according to what was mentioned on the preceding*

page, the timing would be 10 ms or 20 ms respectively, but the relay will temporize 30 ms as it is the minimum timing limit).

On the rest of the positions the timing will be the selected value.

NOTE 3: *If all the selectors are placed on 0 (Tens 0, Units 0, Range 0 and Function 0), the timing will be disabled and the relay will operate in the minimum time possible (electronical and mechanical initialization delay). This time is a bit lower than 20ms. In a relay with an instantaneous coil, both coils the instantaneous and the time-lag will operate at the same time.*

NOTA 4: *The accuracy of the timing will be ±5ms or ±1%, the one which is higher.*

In a **TDF-4DO**:

→ With fix timing: The contacts will have a drop-off delay as indicated on the front part.

→ With selectable timing. The contacts drop-off is selected with a potentiometer on the front part.
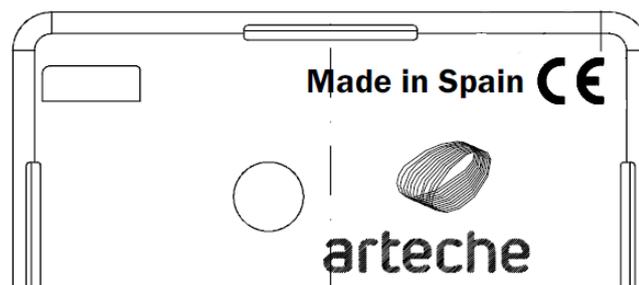
6.2. Functions

Below the 3 timing selectors, there is a forth 10 position selector, which allows to choose the different functions that the relay can execute. The way to make the selection is the same as ones explained before, by the point of the arrow.

On the figure shown below, the selected function would be the 6.
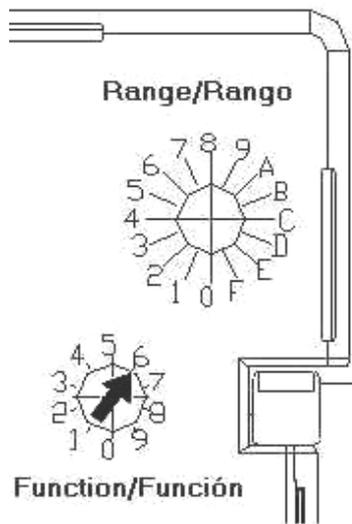
The time diagrams for each of the functions available are printed on the right side of the relay. The descriptions, as well as, the mentioned diagrams for each of these functions are shown below.

The following table resumes all the functions available with a short description of each one:

Function 0	Pick up timing
Function 1	Pick up timing with acceleration by external command
Function 2	Drop out timing, the instantaneous part of the TDF-22 follow the auxiliary supply
Function 3	Drop out timing, the instantaneous part of the TDF-22 follow the external control
Function 4	Timing with continuity control
Function 5	Permanent cycle timing
Function 6	Flashing timing
Function 7	Pick up timing
Function 8	Drop out timing
Function 9	Pick up timing with reduced reseting time
Function TDF-4DO	Drop out timing
RBF	Impulse relay

FUNCTION 0 – FUNCTION 9:

Pick up timing.

As soon as the relay is with auxiliary supply, the timing starts, and the contacts pick up (go from the resting position to the working position) after a period of time t has passed (selected time).

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, the four contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44, the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts will stay picked up every time the relay has auxiliary supply (the contacts follow the auxiliary supply).
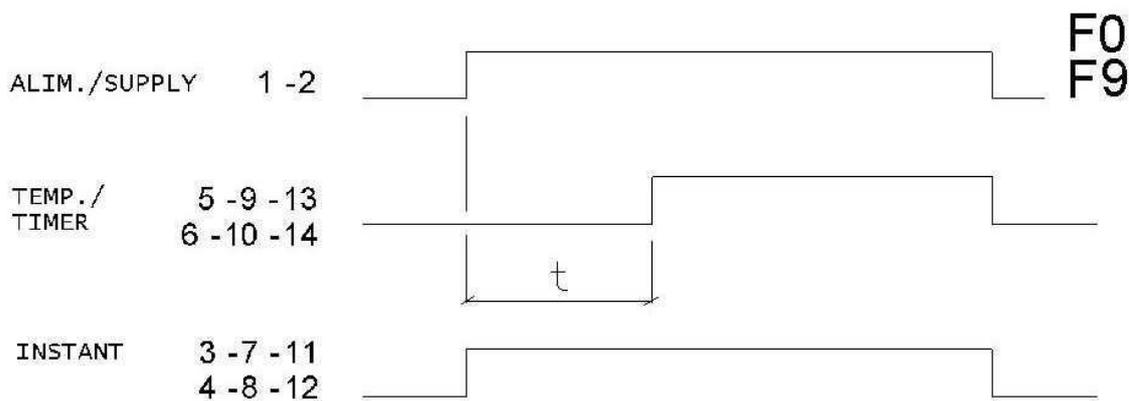
The only difference between functions F0 and F9 is the time the relay resets, (becomes operative again), after a loss of auxiliary supply.

In the function F0, as in the rest of the functions except F9, this time is guaranteed to be less than

200 milliseconds, being at the same time, higher than 100 milliseconds (because this 100 milliseconds is the voltage gap guaranteed).

In the function F9, this time is 50 milliseconds.

NOTE: The period of time mentioned above is the one the relay takes in reset itself (start working as if it has been connected with auxiliary supply for the first time). If the relay loses the auxiliary supply for a lower period of time, the contacts drop out (the mechanics detect the loss) but the timing goes on as if there has not been any loss (the electronics do not detect the loss).

FUNCTION 1

Pick up timing with acceleration by external command.

This function differs from the function F0, in that there is an external command, that when the signal appears, the contacts pick up (go from the resting position to the working position), regardless of the timing that has been selected.

In other words, as soon as the relay is with auxiliary supply, if there is no command signal, the contacts pick up in the period of time selected t; whereas if the command signal appears (which must last more than 10 ms) the contacts pick up, without waiting for this selected period of time to go by (as it is shown in the time diagram).

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44 the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts will stay picked up every time the relay has auxiliary supply (the contacts follow the auxiliary supply).
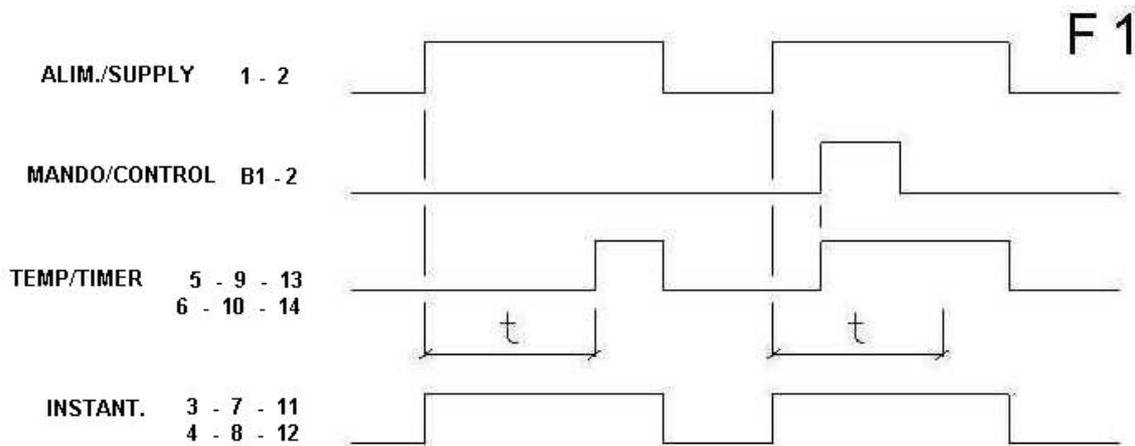
FUNCTION 2

Drop out timing

If the relay is with auxiliary supply and the command signal appears (must last more than 10 ms) the contacts pick up (go from the resting position to the working position); once the command signal disappears, the selected period of time starts to count, after which the contacts drop out (go from the working position to the resting position). In case the command signal disappears and appears again after a period of time t' lower than the time t, the relay clock resets and goes to zero, restarting the time counting. Once the command signal disappears, the contacts continue to be in the working position until the selected period of time t has passed, moment in which the contacts drop out.

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44 the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts will stay picked up every time the relay has auxiliary supply (the contacts follow the auxiliary supply).

FUNCTION 3

Drop out timing.

Identical to function 2 in the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**. In the TDF-22 and TDJ-44 the difference is that the instantaneous contacts stay picked up while the command signal exists (provided that the relay has auxiliary supply), in other words, the contacts follow the command, not the auxiliary supply as in the preceding function.
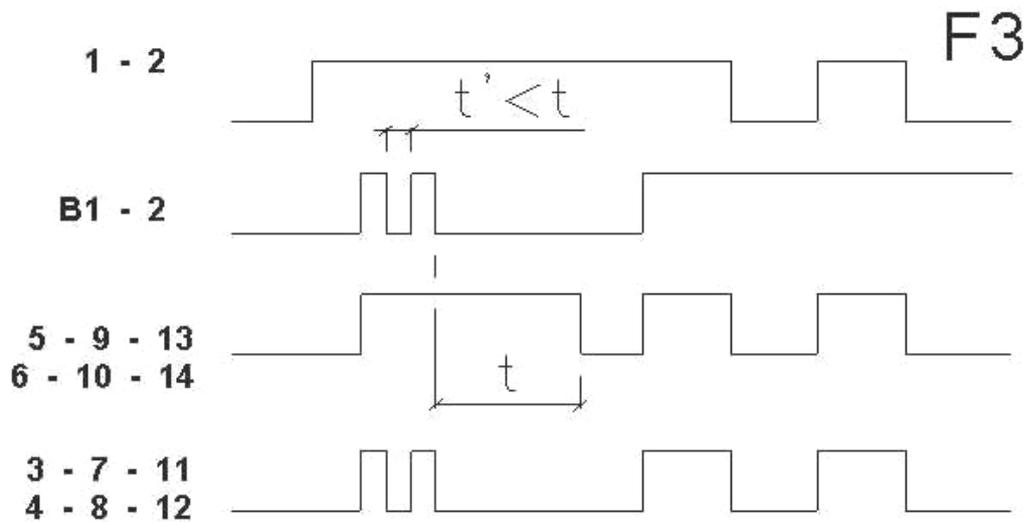
FUNCTION 4

Timing with continuity control.

When the relay has auxiliary supply, the time t (selected period of time) starts to count, after which the contacts pick up (go from the resting position to the working position). If there is no command signal, the contacts stay this way every time the relay has auxiliary supply.

The moment the command signal appears (must last more than 10 ms) the contacts drop out (go from the working position to the resting position). Just after the command signal disappears, the period of time t starts to count, after which the contacts return to the working position. The resting position will be recovered as soon as the command signal appears again.

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44 the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts will stay picked up everytime the relay has auxiliary supply (the contacts follow the auxiliary supply).
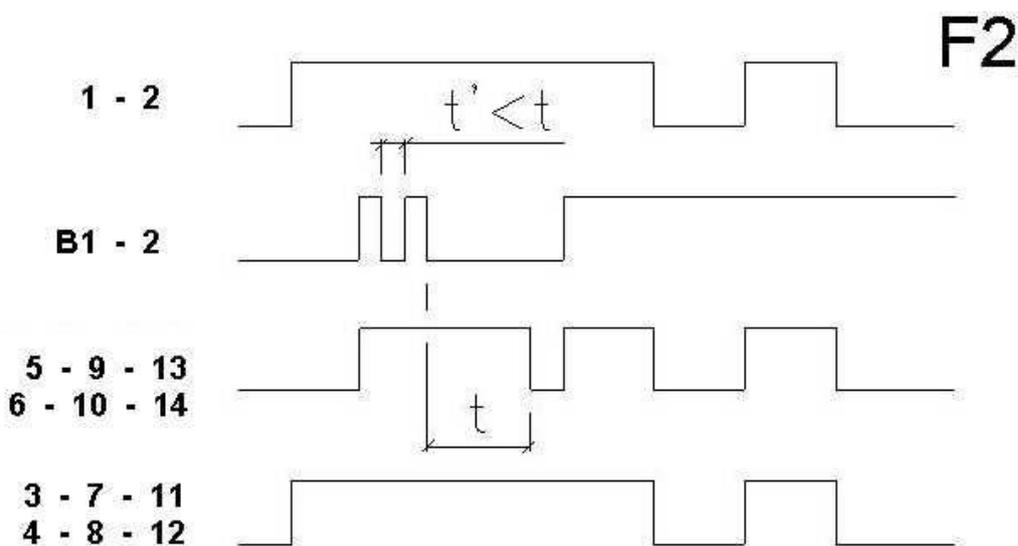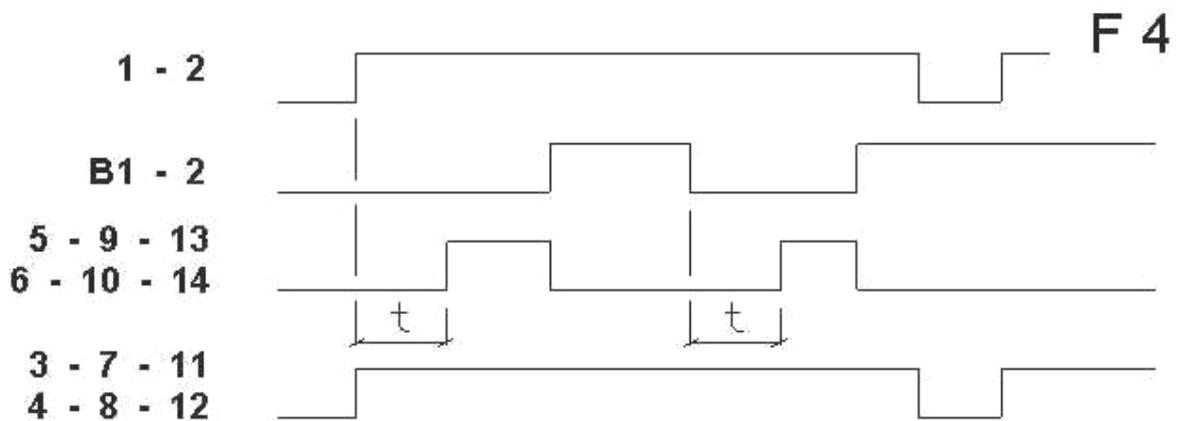
FUNCTION 5

Permanent cycle timing

As soon as the relay has auxiliary supply a timing cycle begins, in which the contacts are 12 hours dropped out and 2 seconds picked up. This process lasts while the relay has auxiliary supply.

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44 the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts will stay picked up every time the relay has auxiliary supply (the contacts follow the auxiliary supply).
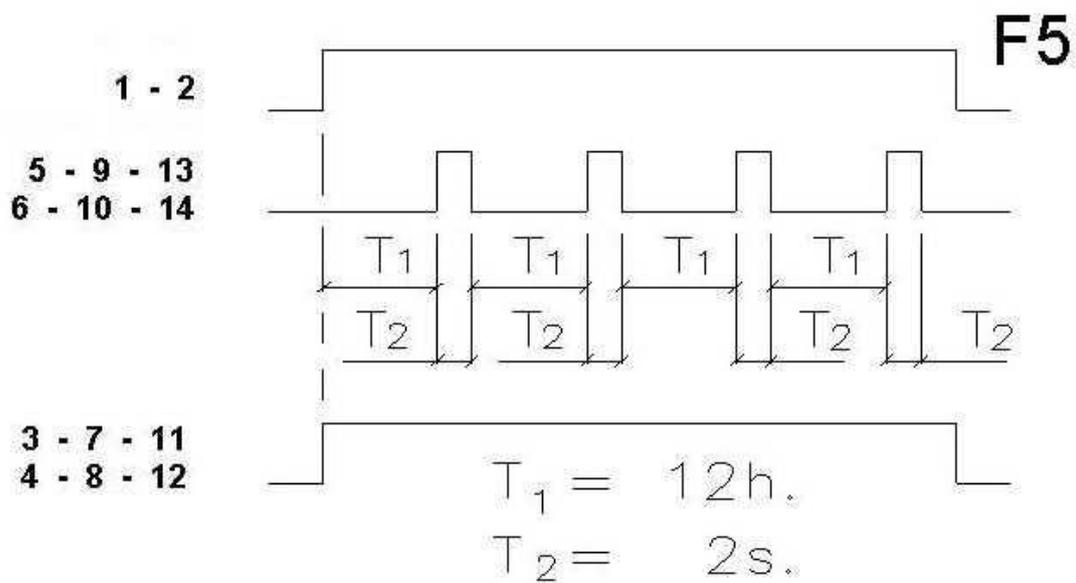
FUNCTION 6

Flashing timing

As soon as the relay has auxiliary supply the timing begins, and after the selected period of time T the contacts pick up (go from the resting position to the working position) and remain in that position for the same period of time. After this time, the contacts drop out (go from the working position to the resting position) and remain in this position for the time T and so on, until the auxiliary supply disappears.

This process changes in case the command signal appears (it must last longer than 10 ms). If this happens, while the command signal exists the contacts remain picked up. Once this signal disappears, the contacts stay in the working position for the period of time T, and afterwards start again with the timing cycles as explained above.

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram) and TDJ-44 the timer contacts operate as it is indicated on the described function, while the two instantaneous contacts remain picked up while the command signal exists (provided that the relay has auxiliary supply), in other words, the contacts follow the command.
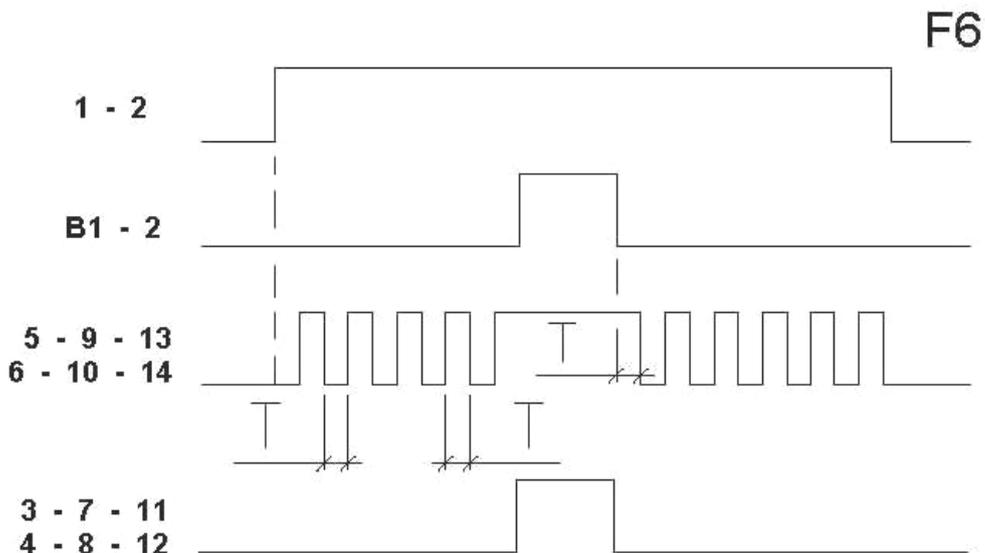
FUNCTION 7

Pick up timing.

If the relay is with auxiliary supply and the command signal appears (must last longer than 10 ms), the contacts pick up (go from the resting position to the working position) and remain in that position for a period of time t.

The time starts running once the command signal appears. If it disappears and returns again before it has passed the time t, does not affect to the counting. The time starts to count when the command appears, and only the first time for each timing.

It can happens that the time t of the command signal could be longer than the timing t, the contacts pick up when the command signals begins to temporize the time t. Once the time t is over, the command signal remains and the selected period of time starts to count, after which the contacts drop out, regardless of the fact that the command signal disappeared in the mean time
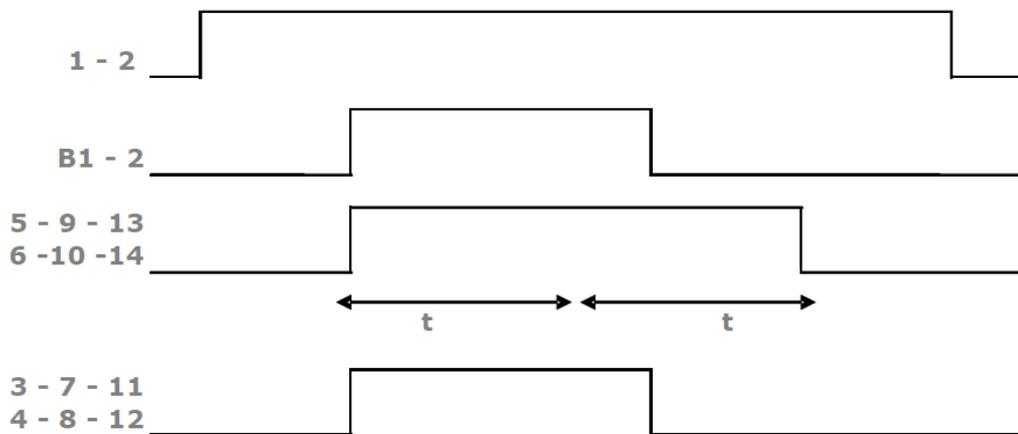
In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8**, all contacts operate this way.

 In the TDF-22 (that is the relay to which belongs the following time diagram), and TDJ-44 timer contacts operate as it is indicated on the described function, while the instantaneous contacts remain picked up while the command signal exists (provided that the relay has auxiliary supply), in other words, the contacts follow the command.

F 7
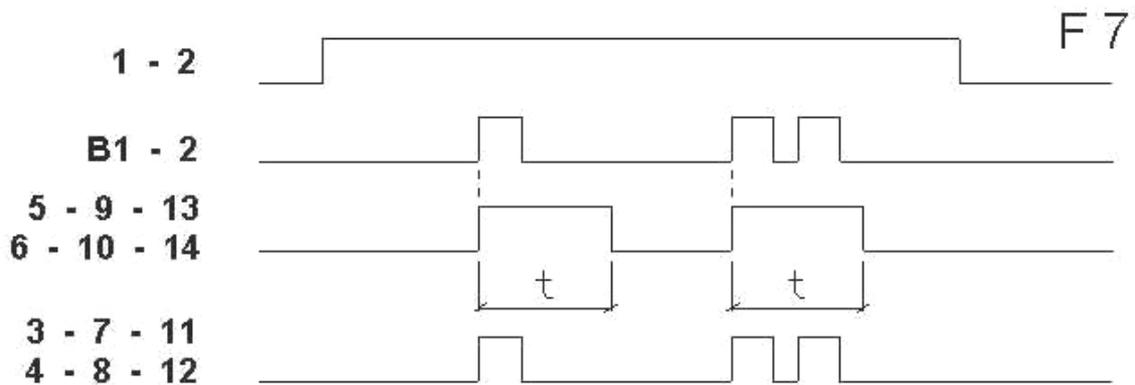
FUNCTION 8

Drop out timing.

If the relay is with auxiliary supply and the command signal appears and disappears (must last longer than 10 ms), the contacts pick up (go from the resting position to the working position) and remain in that position for a period of time t.

The time starts running once the command signal disappears. If it returns and goes away before it has passed the time t, does not affect to the counting. The time starts to count from the disappearance of the command and only the first time for each timing.

In the **TDF-2, TDF-4, CTF-2, CTF-4, TDJ-8 and CTJ-8,** all contacts operate this way.

In the TDF-22 (that is the relay to which belongs the following time diagram) and TDJ-44 the timer contacts operate as it is indicated on the described function, while the instantaneous contacts remain picked up while the command signal exists (provided that the relay has auxiliary supply), in other words, the contacts follow the command.


F 8
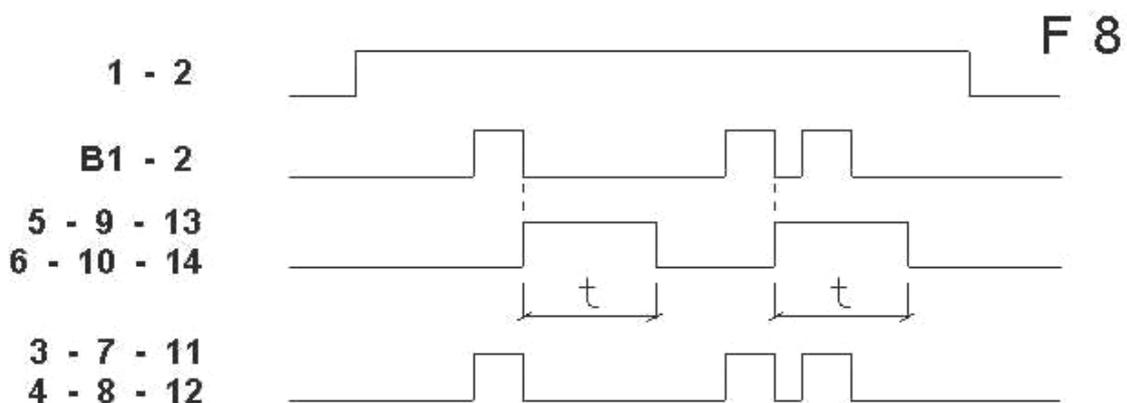
FUNCTION TDF-4DO

Drop-off time lag.

When the relay is energized and the contacts are in working position, as the auxiliary voltage supply disappears the contacts go back to their original position after a period of time t.
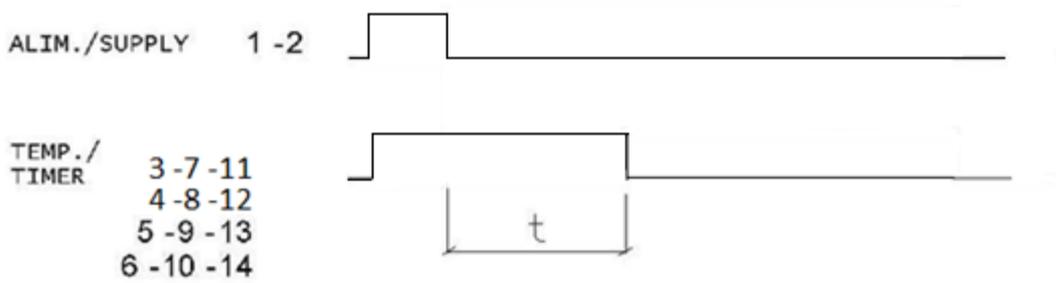
FUNCTION RBF

The RBF-2 and RBF-4 have an impulse relay function. With the power supply on, every impulse in the trigger input changes the contact position.
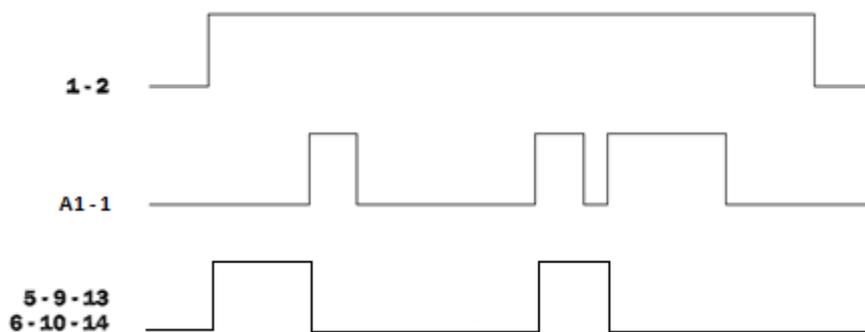
6.3. Indicators in the relay

There are 2 led on the front part of the relay (See figure in page 4):

→ Activation Led: it is a green led that is illuminated permanently when the timer contacts are picked up.

→ Timing Led: it is a red led that flashes intermittently while the timing is in process in the relay, and turns off once the timing has finished.

In a **TDF-4DO**:

→ Activation Led: it is a green led that is illuminated permanently when the timer contacts are picked up.

6.4. Changing the time or function settings

In case the time or function selectors are changed, two situations may happen:

→ The changes are made in the relay without the auxiliary supply: in this case, the changes in the settings, both in the timing and in the the function, will we applied the next time the relay has auxiliary supply.

→ The changes are made while the relay has auxiliary supply: in this case, the modifications will not applied until the relay completely loses the auxiliary supply and is restored again. The loss of the auxiliary supply must be longer than 1s. In other words, it is necessary to disconnect the auxiliary supply of the relay at least 1 second to make effective any change of time or timing function.

Chapter 7. TECHNICAL CHARACTERISTICS

→ Standard voltages

(UN): 24,48,72,96,110,125,220 Vdc/Vac: 50/60 Hz

(Vdc/Vac voltage supply available in the same relay)

TDF-4DO: 24, 48, 72, 96, 110 Vcc

→ Voltage operation range: +25% -30% U_N (except 220 Un and TDF-4DO: +10% -20%)

→ Consumption (U_N):

TDF-2, RBF-2 ,CTF-2		≤ 3,16 W
TDF-22:		≤ 6,00 W
TDF-4, TDF-4DO, RBF-4, CTF-4:		≤ 4,52 W
TDJ-44:		≤ 8,81 W
TDJ-8, CTJ8:		≤ 6,89 W

→ Contacts:

Permanent current: 10 A

Instantaneous current: 30 A/1 s;80 A/200 ms; 150 A/10 ms

Making capacity: 40 A/0,5 s/110 Vdc

Breaking capacity for 105 operations:

1,2 A; 110 Vdc; 0 ms

0,8 A; 110 Vdc; 20 ms

0,5 A; 220 Vdc; 0 ms

0,3 A; 220 Vdc; 20 ms

High breaking capacity range (CTF-2, CTF-4, CTJ8):

Capacidad de corte	Contactos NA (alto poder de corte)	125 Vdc 40ms current breaking capacity		220Vdc 40ms current breaking capacity	
	Contactos NC (contactos estándar)	**125 VDC** (100.000 maniobras)		**220 VDC** (50.000 maniobras)	
		0ms	1,00 A	0ms	0,57 A
		40ms	0,52 A	40ms	0,27 A
Max. Capacidad de Corte		Ver valores para 100 operaciones			
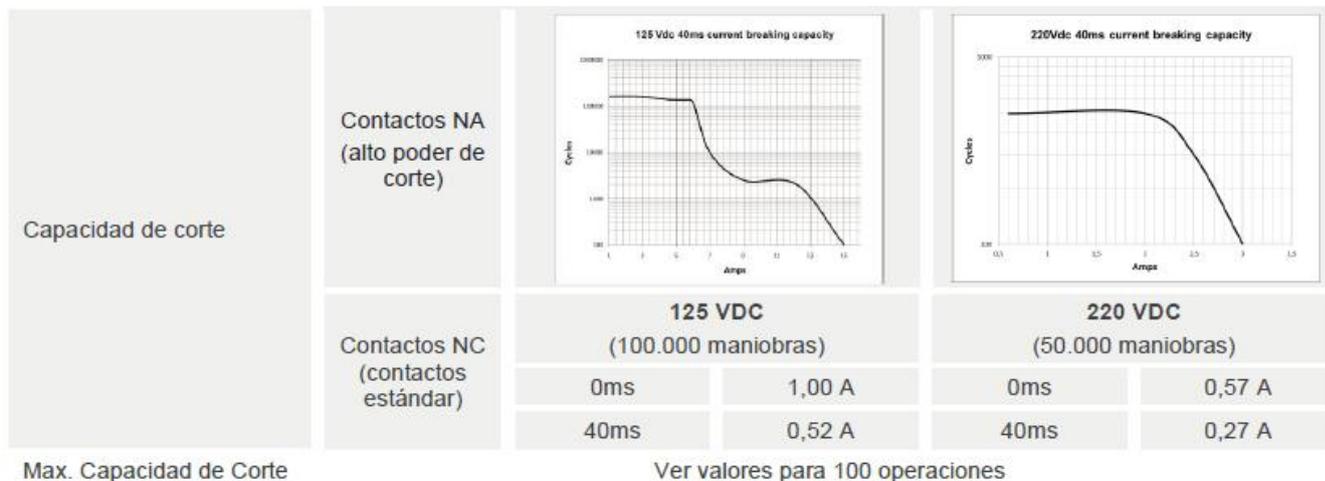
→ U_{max}, opened contact: 250 Vdc/400 Vac

→ Mechanical life: 10^7 operations

→ Operating temperature: -10°C +55°C

→ Operating humidity: 93%/40°C

→ Seismic characteristics according to IEEE501

   Degree of ZPA: 3 g/33 Hz

Chapter 8. STADARDS AND TESTS

8.1. Construction Standards

→ Electrical test   **IEC 60255-5**

   Dielectric test   2 kV/50 Hz/1 min

   Surge withstand   5 kV/1,2/50 µs

   Insulation   > 2000 MΩ/500 Vdc

→ Inflammability tests   **IEC60692-2-1**

   Plastic materials   **UL94:** V0

                                                            IEC 60695: 850°C/30 s

→ Cover protection degree   **IEC60529, EN60529**: IP40

→ Climatic tests **IEC60255-7**

    Dry heat **IEC60068-2-2**

      → Non-dissipating sample +70°C/96 h

      → Dissipating sample +55°C/96 h

    Cyclic humid heat **IEC60068-2-30**: +55°C/12 h

    Cold 100 cycles **IEC60068-2-1**

    Non-dissipating sample -10°C/2h

    Thermal aging test **IEC60255-7**

    At nominal voltage (U_N) +55ºC/1440 h

8.2. Electromagnetical Compatibility Tests

→ Electrostatic discharge (level 3) **EN61000-4-2, IEC61000-4-2**

    Air mode ± 8 kV

    Contact mode ± 6 kV

→ Radiated electromagnetic field (level 3) **EN61000-4-3, IEC61000-4-3**

    10 V/m

→ Fast transient (burst) (level 4) **EN61000-4-4, IEC61000-4-4**

    Aux. supply ±4 kV/5 kHz

    Inputs ±4 kV/5 kHz

→ Impulse test voltage (surge) (level 3) **EN61000-4-5, IEC61000-4-5**

    Common mode ±2 kV

    Differential mode ±1 kV

→ Conducted disturbances induced **EN61000-4-6, IEC61000-4-6**

    by radio frequency fields (level 5) 10 V

→ Power frequency magnetic field (level 5) **EN61000-4-8, IEC61000-4-8**

    Permanent 100 A/m

During 1s	1000 A/m
→ Damped oscillatory magnetic field	**EN61000-4-10, IEC61000-4-10**
1 MHz and 0,1 MHz (level 5)	100 A/m
→ Oscillatory waves 1 MHz and 0,1 MHz (level 3)	**EN61000-4-12**
	100 A/m
Common mode	2,5 kV
Differential mode	1 kV

8.3. Vibration and shock stress tests

→ Railway applications. Rolling stock equipment.   **IEC 613736**

Vibration and shock test:

Test Level   Category 1, Class B

→ Requirements for vibration and shock testing   **RIA 20**

of equipment intended for use on railway vehicles:

Test Level   Category 1, Class B

→ Recommended Practice for Seismic Qualification

of Class 1E Equipment for Nuclear Power Generating Stations   **IEEE 344**

Test Level:

ZPA = 3 with sockets mounted on Rail DIN ZPA = 3,5 with screwed socket

Chapter 9. Dimensions and types of sockets

9.1. Dimensions of the relays TDF-22, TDF-4, CTF-2, CTF-4, RBF and TDF-4DO
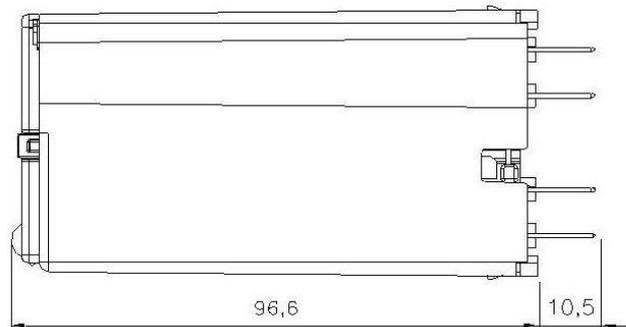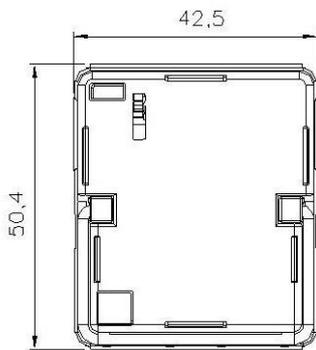
9.2. Dimensions of the relays TDJ-44, TDJ-8 and CTJ-8.
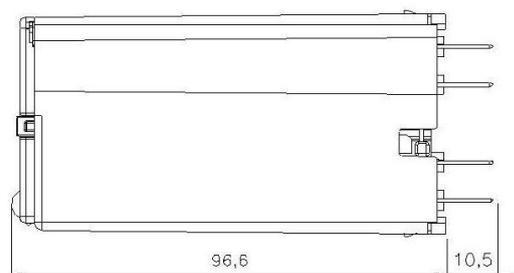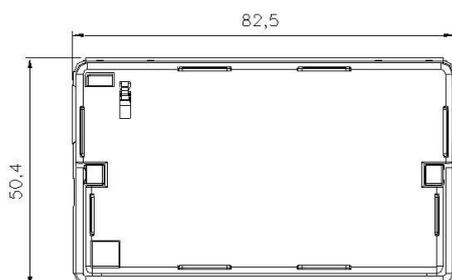
9.3. Sockets.

	TDF-2, TDF-22, TDF-4, CTF-2, CTF-4, TDF-4DO, RBF		TDJ-44, TDJ-8, CTJ-8	
	Screw	Doble Faston	Screw	Doble Faston
Front connection	FN-DE IP 10	FN-DE2C IP 10	JN-DE IP 10	JN-DE2C IP 10
Rear connection	F-TR OP	FN-TR2C OP	JN-TR OP	JN-TR2C OP
Flush mounting	F-EMP OP		J-EMP OP	

Base FN-DE IP10 · FN-DE2C IP10 Socket

Base FN-TR OP · FN-TR2C OP Socket

Base F-EMP OP · F-EMP2C OP Socket

Minimo par de apriete: 0,5 Nm
Máximo par de apriete: 1 Nm
Minimum torque value: 0,5 Nm
Maximum torque value: 1 Nm

Base JN-DE IP10 · JN-DE2C IP10 Socket

Base JN-TR OP · JN-TR2C OP Socket

Base J-EMP OP · J-EMP2C OP Socket
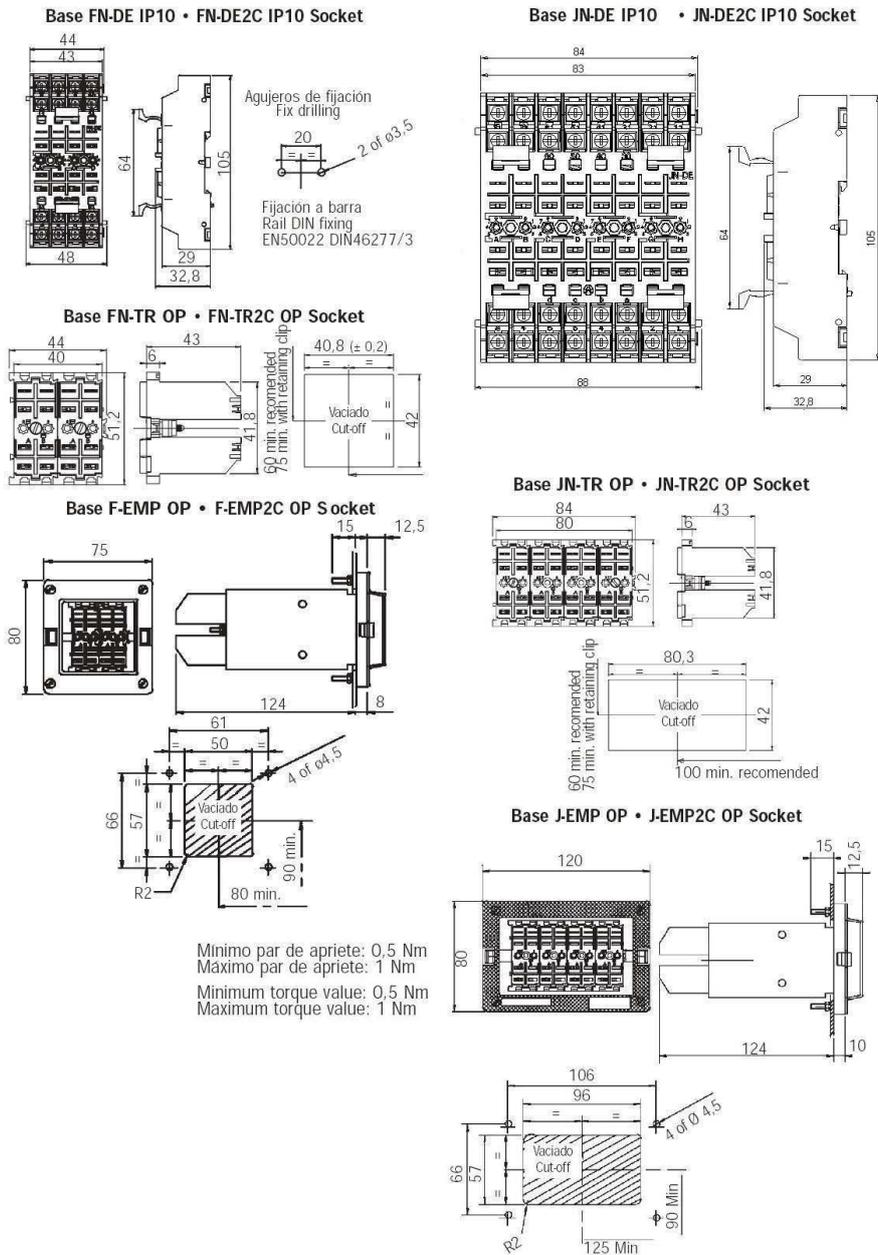
Appendix A. Model selection table TDF/TDJ

RANGE AND SELECTION TABLE						
Model	**Contacts type**	**Voltage Vcc·Vca**	**OP**	**0**	**X**	**0**
TDF-2	2 timer contacts					
TDF-4	4 timer contacts					
TDF-22	2 timer + 2 instantaneous					
TDJ-8	8 timer contacts					
TDJ-44	4 timer + 4 instantaneous					

OPTIONS			
	Dependent	0	
	24 Vdc Vac	1	
	48 Vdc Vac	2	
	60 Vdc Vac	3	
Independent command voltage	72 Vdc Vac	4	
	96 Vdc Vac	5	
	110 Vdc Vac	6	
	125 Vdc Vac	7	
	220 Vdc Vac	8	

Example: TDF-22, 125 Vcc OP000

Appendix B. Model selection table TDF-4DO

Timers	Type	Timing type	Range ▮	Aux Supply
Model Selection ▶▶				FF
Relay with 4 timer contacts	TDF-4DO			
Fix time between 0 and 1000 ms *) for 72 VDC between 0 and 800 ms		F	XXXM	
Adjustable with potentiometer: 0-500ms 100-600ms 200-700ms 300-800ms *) limit for 72VDC coil version 400-900ms 500-1000 ms And intermediate combinations with 500 ms steps			YYYM	
Aux. Supply				
Indicate voltage level (ex.: 24Vdc)				

XXXM --- Indicate the fix time selected between 0 and 1000 ms
YYYM --- Indicate th upper limit of selected range

Example: TDF-4DOF 890M 110Vdc FF, TDF-4DO 1000M 96 Vdc FF

Appendix C. Model selection table Time Lag Contactors

| Contactors (Timers)	Type		Aux. Supply Vdc/Vac		OP		FF	*
Model Selection ▶▶	▲		▲			▲		
General purpose range								
Contactor with 2 timer contacts	CTF-2					O		
Contactor with 4 timer contacts	CTF-4					O		
Contactor with 2 instantaneous contacts + 2 timer contacts	CTF-22					O		
Contactor with 8 timer contacts	CTJ-8					O		
Contactor with 4 instantaneous contacts + 4 timer contacts	CTJ-44					O		
Aux. Supply Vdc								
Indicate voltage level (ex:24 Vdc)								
Options								
Command sign and voltage	Dependent Standard						O	
	Independent Different voltages for the command signal and the power supply	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	

(Standard model)

* Energy / Railway application.

Example: CTF-2 110Vdc/Vac OP2 FF

Appendix D. Model selection table RBF

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

Example: RBF-4 110 Vdc FF
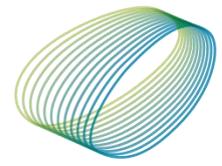
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