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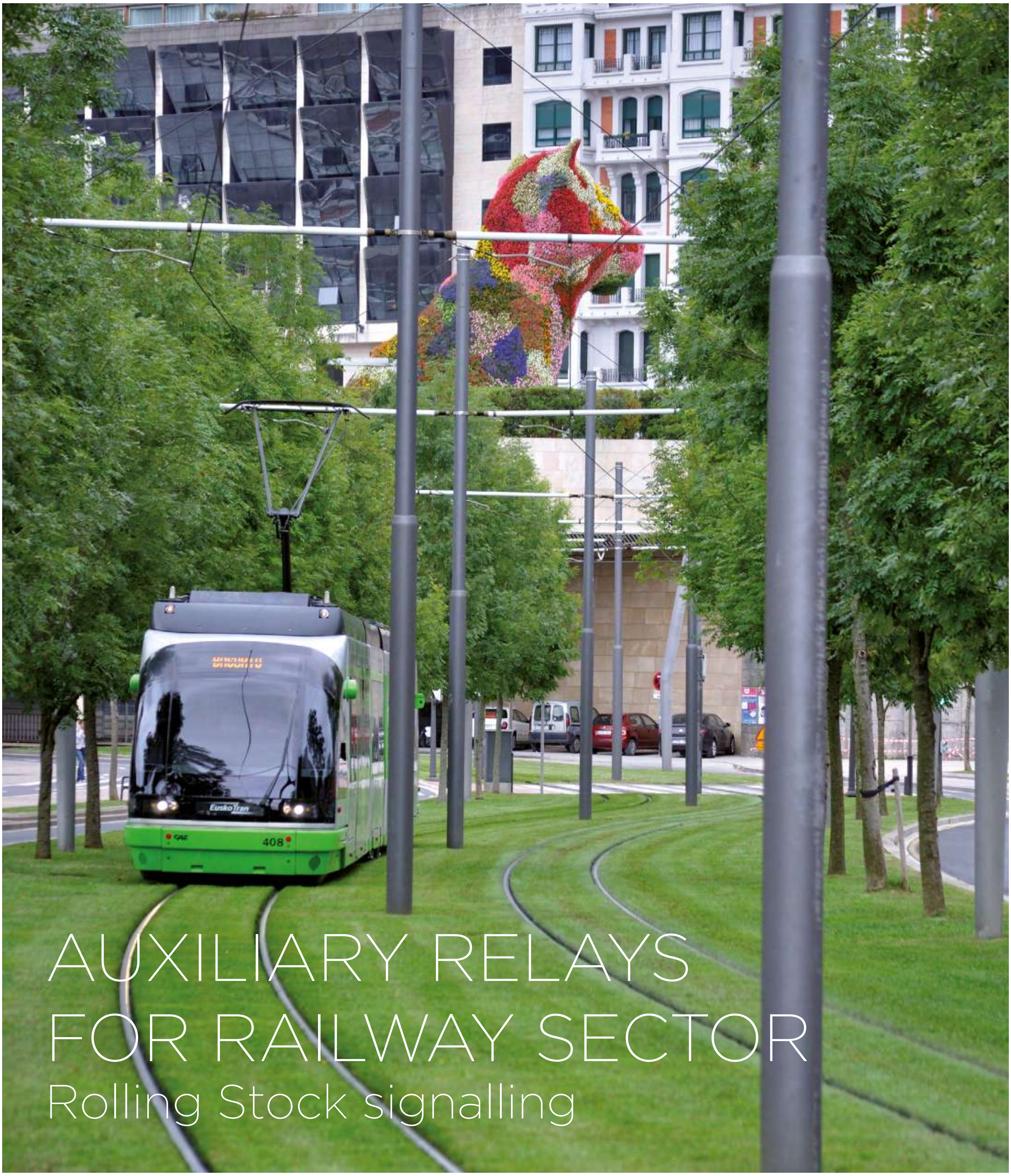

AUXILIARY RELAYS FOR RAILWAY SECTOR

Rolling Stock signalling

Moving together

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INDEX

ANSWERS FOR RAILWAY APPLICATIONS

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

The design, durability and quality of the different alternatives that ARTECHE relays can offer (FF range and standard range), make them suitable for high responsibility controls in the railway sector, highlighting:

FF RANGE IN THE FOLLOWING APPLICATIONS:

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

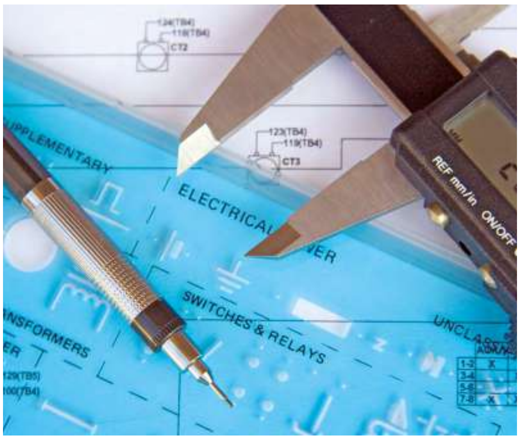
The main features of ARTECHE's auxiliary relays are the followings:

- Security contacts, WELD NO TRANSFER (EN 50205 Standard).
- Forcibly guided contacts, WELD NO TRANSFER (EN 50205 / IEC 61810-3):
  - Type A: Relay in which all contacts are mechanically linked.
  - Type B: Relay containing contacts that are mechanically linke to each other as well as contacts that are not mechanically linked.
- 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 or by the magnetic blow out, high speed operation of the output 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.

RAILWAY APPLICABLE STANDARDS

- **EN 50155** (**IEC 60571 equivalent**). Railway applications - Electronic equipment used on rolling stock.
- **IEC 61373**. Railway applications - Shock and vibration tests.
- **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 50205 / EN 61810-3**. Relays with forcibly guided (mechanically linked) contacts. WELD NO TRANSFER.



GENERAL STANDARDS

- **EN IEC 61810**: Electromechanical all-or-nothing relays.
- **IEC 61812**: Specified time relays for industrial use.
- **IEC 60947**: Low-voltage switchgear and controlgear.
- **EN 60077** Series. Rolling stock equipment.
  - Part 1: General conditions in service and general terms.
  - Part 2: Electrotechnical components.

INSTANTANEOUS RELAYS

- From 2 to 8 contacts with different options available (push to test button, led, mechanical indication of contact position).
- Variants for coil overvoltage protection.
- Operating time < 20 ms.

TIMER RELAYS

- Up to 10 different functions in the same relay.
- Wide timing range, from 30 ms up to 99 h.
- From 2 to 8 contacts.
- Possibility to combine instantaneous contacts and timer contacts in the same relay.
- Reduction of references for maintenance, as the same reference can cover multiple applications.
- Variant for drop-out timing with one single input.

CONTACTOR RELAYS

- Instantaneous relays incorporating magnetic blow-out to increase the breaking capacity of the normally open (NO) contacts.
- Range from 2 to 8 contacts and variants for coil overvoltage protection.

LATCHING RELAYS

- Relays with two stable positions maintained by a permanent magnet, which prevents intermediate positions and assures reliability.
- Range from 3 to 8 contacts, including visual indication of the position of the contacts, and variants for coil overvoltage protection.
- No consumption in permanence, only during the change of contact position.

IMPULSE RELAYS

- Similar to latching relay with a single input. While powered, a trigger signal changes contact position.

SOCKETS AND ACCESSORIES

- Different types of sockets allowing DIN rail, wall or panel / flush mounting, as well as front or rear connection.
- Variants for screw, faston and spring clamp connectors.
- Retaining clips of different types available.
- Optional keying pins to ensure only the correct type of relay can be plugged in a certain socket.

RAILWAY APPLICATIONS

MODEL	ROLLING STOCK	SIGNALING	CONTACTS	FORCIBLY GUIDED CONTACTS - WELD NO TRANSFER (EN 50205 / iEC 61810-3)
Instantaneous				
RD-2SY FF	•	•	2 CO	Type A
RF-4SY FF	•	•	4 CO	Type A
RJ-8SY FF	•	•	8 CO	Type A
RD-2SYDI FF / RD-2SYV FF	•	•	2 CO	Type A
RF-4SYDI FF / RF-4SYV FF	•	•	4 CO	Type A
RJ-8SYDI FF / RJ-8SYV FF	•	•	8 CO	Type A
Timers				
TDF-2 FF	•	•	2 CO	Type A
TDF-4 FF	•	•	4 CO	Type A
TDF-4DO FF	•	•	4 CO	Type A
TDF-22 FF	•	•	4 CO (2 inst. + 2 timed)	Type B
TDJ-8 FF	•	•	8 CO	Type A
TDJ-44 FF	•	•	8 CO (4 inst. + 4 timed)	Type B
Latching				
BF-3 FF	•	•	3 CO	
BF-4 FF	•	•	4 CO	
BJ-8 FF	•	•	8 CO	
BF-3BB FF	•	•	3 CO	
BF-4BB FF	•	•	4 CO	
BJ-8BB FF	•	•	8 CO	
Contactors				
CD-2 FF	•	•	2 CO (2NO Contactor + 2NC Relay)	
CF-4 FF	•	•	2 CO (4NO Contactor + 4NC Relay)	
CJ-8 FF	•	•	4 CO (8NO Contactor + 8NC Relay)	
Impulse				
RBF-2 FF	•	•	2 CO	Type A
RBF-4 FF	•	•	4 CO	Type A

Type A contacts: All contacts are mechanically linked.

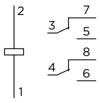
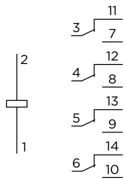
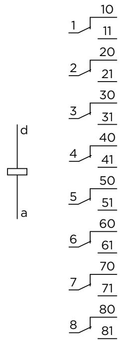
Type B contacts: Instantaneous contacts mechanically linked. Timer contacts mechanically linked. Instantaneous and Timer contacts not mechanically linked between them.

All Type A relays are marked indicating their condition.

TECHNICAL FEATURES PER MODEL

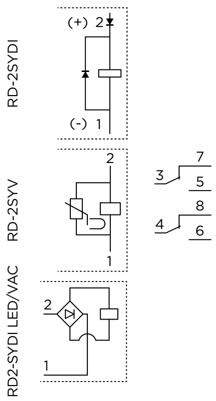
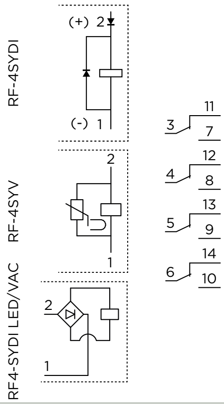
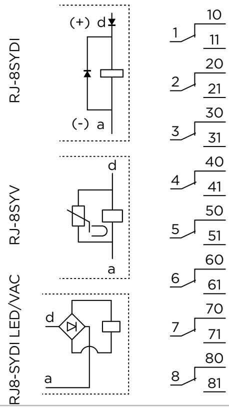
› World-class range of auxiliary relays for energy sector, specially designed for the most demanding applications

INSTANTANEOUS RELAYS

Model	RD-2SY OP FF	RF-4SY OP FF	RJ-8SY OP FF
			
Applications	General purpose and safety applications		
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 (D short)	(A) 42.5 x (B) 50.4 x (C) 72 (F short)	(A) 82.5 x (B) 50.4 x (C) 72 (J short)
Coil characteristics			
Standard voltages[(1)]	24, 48, 72, 96, 110 Vdc		
Voltage range	+25% -30% U_N		
Pick-up / release voltage	See pick-up/release voltage-temperature curves		
Inductance at U_{nom}: Energized	10.5 ms	16.2 ms	18.5 ms
Released	8.2 ms	10.8 ms	9.3 ms
Average consumption in permanence (U_N)	2.6 W	3.9 W	7.5 W
Operating time			
Pick-up time	<20 ms		
Drop-out time	Vdc: <10 ms	Vdc: <15 ms	
Contacts			
Contact material	AgNi		
Contacts resistance[(2)]	≤15 mΩ		
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		
Minimum current/voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0.5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op/ 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.2 mm)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	$3 \cdot 10^7$ 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	>1,000 MΩ		
Operating temperature	-65°C+70°C		
Storage temperature	-65°C+85°C		
Max. operating humidity	95%		
Operating altitude[(3)]	<2,000 m		

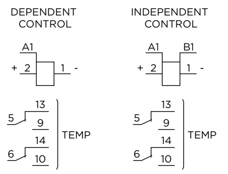
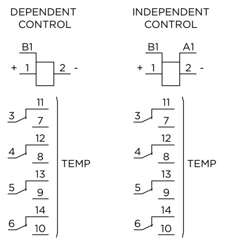
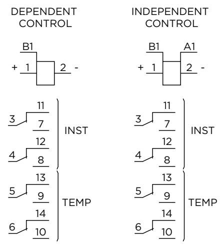
(1) Other voltage upon request
(2) Guarantee data for relays just manufactured
(3) Ask for higher altitudes

INSTANTANEOUS RELAYS WITH COIL OVERVOLTAGE PROTECTION

Model	RD-2SYDI OP FF RD-2SYV OP FF	RF-4SYDI OP FF RF-4SYV OP FF	RJ-8SYDI OP FF RJ-8SYV OP FF
			
Applications	General purpose and safety applications. With coil overvoltage suppression protecting the output contacts of the equipment energizing the coil of the relay, by adding a freewheeling diode (DI) or varistor (V).		
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 (D short)	(A) 42.5 x (B) 50.4 x (C) 72 (F short)	(A) 82.5 x (B) 50.4 x (C) 72 (J short)
Coil characteristics			
Standard voltages[1]	24, 48, 72, 96, 110 Vdc / 24, 48, 63,5, 110, 127, 230 Vac (50-60 Hz)		
Voltage range	+25% -30% U_N		
Pick-up / release voltage	See pick-up/release voltage-temperature curves		
Inductance at U_{nom}: Energized Released	10.5 ms 8.2 ms	16.2 ms 10.8 ms	18.5 ms 9.3 ms
Average consumption in permanence (U_N)	2.6 W	3.9 W	7.5 W
Operating time			
Pick-up time	<20 ms		
Drop-out time	V Series: <25 ms DI Series, VAC or with LED: <50 ms		
Contacts			
Contact material	AgNi		
Contacts resistance[2]	≤15 mΩ		
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		
Minimum current / voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0.5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op/ 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.2 mm)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	$3^{*}10^{7}$ 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	>1,000 MΩ		
Operating temperature	-65°C+70°C		
Storage temperature	-65°C+85°C		
Max. operating humidity	95%		
Operating altitude[3]	<2,000 m		

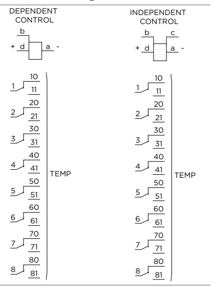
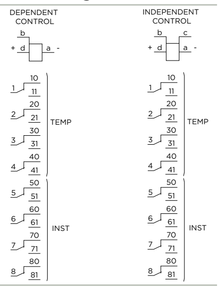
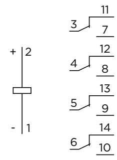
(1) Other voltage upon request
(2) Guarantee data for relays just manufactured
(3) Ask for higher altitudes

TIMER RELAYS (I)

Model	TDF-2 OP FF	TDF-4 OP FF	TDF-22 OP FF
			
Applications	General purpose and safety applications. 10 function timing with coil overvoltage protection		
Construction characteristics			
Timing Contacts no.	2 Changeover	4 Changeover	2 Changeover
Instantaneous contact no.	0 Changeover	0 Changeover	2 Changeover
Connections			
Options (With OP options)	DEPENDENT CONTROL **S 2-1** Supply Voltage **C A1-1** Control Voltage INDEPENDENT CONTROL **S 2-1** Supply Voltage **C A1-B1** Control Voltage	DEPENDENT CONTROL **S 1-2** Supply Voltage **C B1-2** Control Voltage INDEPENDENT CONTROL **S 1-2** Supply Voltage **C B1-A1** Control Voltage	DEPENDENT CONTROL **S 1-2** Supply Voltage **C B1-2** Control Voltage INDEPENDENT CONTROL **S 1-2** Supply Voltage **C B1-A1** Control Voltage
Weight (g)	265		
Dimensions (mm)	(A) 42.5 x (B) 50.4 x (C) 96.6 (F large type)		
Coil characteristics			
Standard voltages(1)	24, 48, 72, 96, 110, 230 Vdc/Vac (50-60 Hz)		
Voltage range	+25% -30% U_N		
Pick-up / release voltage	See power supply-temperature charts for timer relays		
Inductance at U_{nom}: Energized	10.5 ms	16.2 ms	16.2 ms
Released	8.2 ms	10.8 ms	10.8 ms
Average consumption in permanence (U_N)	3.1 W	4.5 W	6.1 W
Average consumption during time delay (coil not energized) (U_N)	0.5 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(2)	≤15 mΩ		
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		
Minimum current / voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0.5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op/ 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.2 mm)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	10^7 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	>1,000 MΩ		
Operating temperature	Up to 125 Vdc: -40°C+70°C / 230 Vdc: -40°C+55°C		
Storage temperature	-50°C+85°C		
Max. operating humidity	95%		
Operating altitude(3)	<2,000 m		

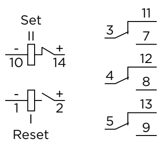
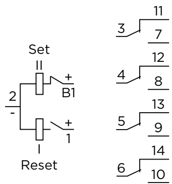
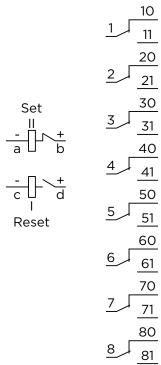
(1) Other voltage upon request
(2) Guarantee data for relays just manufactured
(3) Ask for higher altitudes

TIMER RELAYS (II)

Model	TDJ-8 OP FF	TDJ-44 OP FF	TDF-4DO OP FF
			
Applications	General purpose and safety applications 10 function timing with coil overvoltage protection		Selectable drop out timing with one single input (no additional supply req.) and coil overvoltage protection
Construction characteristics			
Timing Contacts no.	8 Changeover	4 Changeover	4 Changeover
Instantaneous contact no.	0 Changeover	4 Changeover	0 Changeover
Connections	 	 	
Options (With OP options)	**S d-a** Supply Voltage **C b-a** Control Voltage **S d-a** Supply Voltage **C b-c** Control Voltage	**S d-a** Supply Voltage **C b-a** Control Voltage **S d-a** Supply Voltage **C b-c** Control Voltage	Fixed timing / Selectable by front potentiometer
Weight (g)	500		265
Dimensions (mm)	(A) 82.5 x (B) 50.4 x (C) 96.6 (large type)		(A) 42.5 x (B) 50.4 x (C) 96.6 (large type)
Coil characteristics			
Standard voltages[1]	24, 48, 72, 96, 110, 230 Vdc/Vac (50-60 Hz)		24, 48, 72, 96, 110 Vdc
Voltage range	+25% -30% U_N		
Pick-up / release voltage	See power supply-temperature charts for timer relays		
Inductance at U_{nom}: Energized	18.5 ms	18.5 ms	16.2 ms
Released	9.3 ms	9.3 ms	10.8 ms
Average consumption in permanence (U_N)	6.1 W	9.1 W	4.5 W
Average consumption during time delay (coil not energized) (U_N)	0.5 W		
Operating time			
Time range	Between 0.03 s to 99 h		**Fixed, defined during purchase order**: between 0 and 1,000 ms[4] **Fixed, selectable by front potentiometer**: 0-500 ms/100-600 ms/200-700 ms/300-800 ms (limit of coil voltage 72 Vdc)/400-900 ms/500-1,000 ms/and intermediate combinations (with steps of 500 ms)
Pick-up time	<23 ms		
Drop-out time	<50 ms		
Maximum drop-out time delay[4]			1,000 ms for the entire range of voltages and temperatures
Contacts			
Contact type	8 Changeover		4 Changeover
Contact material	AgNi		
Contacts resistance[2]	≤15 mΩ		
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		
Minimum current / voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0.5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op/ 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.2 mm)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	10^7 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	>1,000 MΩ		
Operating temperature	Up to 125 Vdc: -40°C+70°C / 230 Vdc: -40°C+55°C		
Storage temperature	-50°C+85°C		
Max. operating humidity	95%		
Operating altitude[3]	<2,000 m		

[1] Other voltage upon request
[2] Guarantee data for relays just manufactured
[3] Ask for higher altitudes
[4] Except for 72Vdc, between 0-800 ms

LATCHING RELAYS

Model	BF-3 FF	BF-4 FF	BJ-8 FF
			
Applications	General purpose applications		
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 (F large type)		(A) 90 x (B) 50 x (C) 100.5 (J large type)
Coil characteristics			
Standard voltages(1)	24, 48, 72, 96, 110 Vdc / 63,5, 110, 127, 230 Vac (50-60 Hz)		
Voltage range	+25% -30% U_N		
Pick-up voltage	See pick-up voltage / Temperature curves for latching relays		
Consumptions only in the change-over	6 W		12 W
Operating time			
Pick-up time	<20 ms		
Contacts			
Contact material	AgNi		
Contacts resistance(2)	≤15 mΩ		
Distance between contacts	1.8 mm		
Permanent current	10 A		
Instantaneous current	80 A during 200 ms / 200 A during 10 ms		
Minimum current / voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0,5 s, 110 Vdc / 30 A, 1 s, 36 Vdc / 30,000 operations (1 op / 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.8 m)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	10^7 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	>1,000 MΩ		
Operating temperature	-40°C+70°C		
Storage temperature	-40°C+85°C		
Max. operating humidity	95%		
Operating altitude(3)	<2,000 m		

(1) Other voltage upon request
(2) Ask for higher altitudes
(3) Guarantee data for relays just manufactured

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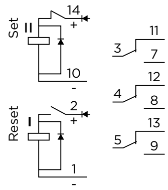
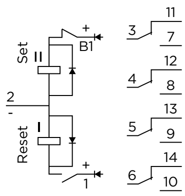
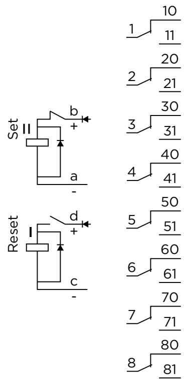
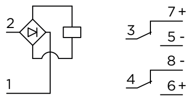
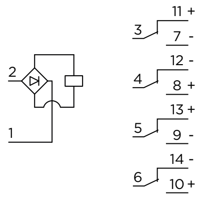
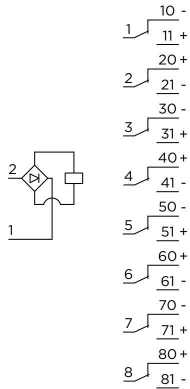
LATCHING RELAYS WITH COIL OVERVOLTAGE PROTECTION

Model	BF-3BB FF	BF-4BB FF	BJ-8BB FF
			
Applications	General purpose applications with coil overvoltage protection		
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 (F large type)		(A) 90 x (B) 50 x (C) 100.5 (J large type)
Coil characteristics			
Standard voltages[1]	24, 48, 72, 110 Vdc		
Voltage range	+25% -30% U_N		
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[2]	≤15 mΩ		
Distance between contacts	1.8 mm		
Permanent current	10 A		
Instantaneous current	80 A during 200 ms / 200 A during 10 ms		
Minimum current / voltage	12 Vdc, 10 mA		
Max. making capacity	40 A, 0,5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op / 15 s)		
Breaking capacity	See breaking capacity curves (Contact gap= 1.8 mm)		
Max. breaking capacity	See value for 50,000 operations		
U_{max} opened contact	250 Vdc / 400 Vac		
General data			
Mechanical endurance	10^7 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	>1,000 MΩ		
Operating temperature	-40°C+70°C		
Storage temperature	-40°C+85°C		
Max. operating humidity	95%		
Operating altitude[3]	<2,000 m		

[1] Other voltages and AC versions upon request
[2] Guarantee data for relays just manufactured
[3] Ask for higher altitudes

CE EAC UK CA

CONTACTORS RELAYS

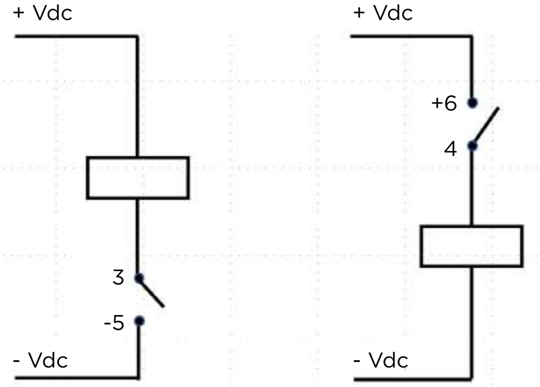
Model		CD-2 FF	CF-4 FF	CJ-8 FF
				
Applications		General purpose contactors with coil overvoltage protection. Enhanced breaking capacity NO contacts with magnetic arc blowout and standard capacity NC contacts[3]. Outer contacts are suitable for switching low currents (10 mA).		
Construction characteristics				
Contacts no.		2 Changeover polarized	4 Changeover polarized	8 Changeover polarized
Connections				
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[1]		24, 48, 72, 96, 110 Vdc / 24, 48, 63,5, 110, 230 Vac (50-60 Hz)		
Voltage range		+25% -30% U_N		
Inductance at U_{nom}:	Energized	10.5 ms	18.5 ms	16.2 ms
	Released	8.2 ms	9.3 ms	10.8 ms
Pick-up / release voltage		See pick-up / release voltage-temperature curves		
Average consumption in permanence (U_N)		2.6 W	3.9 W	6 W
Operating time				
Pick-up time		<20 ms		
Drop-out time		50 ms		
Contacts				
Contact material		AgNi		
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		
Minimum current / voltage		12 Vdc / 10 mA	Outer contacts 3-11/7 & 6-14/10= 12 Vdc /10 mA	Outer contacts 1-10/11 & 8-80/81= 12 Vdc /10 mA
Max. making capacity		40 A, 0,5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op / 15 s)		
Breaking capacity		See breaking capacity curves (Contactor curve for the NO contacts, standard 1.2 mm contact gap curves for NC contacts)		
Max. breaking capacity		125 Vdc - 40 ms: Contacts NO 6 Amp. 10^5 operations - 15 Amp. 100 operations; Contacts NC 0.52 Amp. 50,000 operations		
U_{max} opened contact		250 Vdc / 400 Vac		
General data				
Mechanical endurance		10^7 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		>1,000 MΩ		
Operating temperature		-40°C+70°C		
Storage temperature		-40°C+85°C		
Max. operating humidity		95%		
Operating altitude[3]		<2,000 m		

[1] Other voltage upon request
[2] Higher altitudes upon request

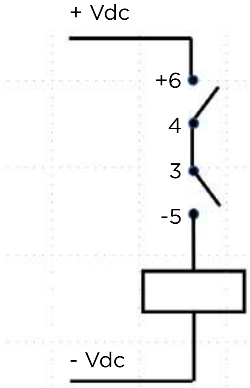
[3] The contacts must be wired so that the current flows from (+) contacts to moving contacts and from moving contacts to (-) contacts. See the wiring diagram in the following page.

EXAMPLES

One NO contact

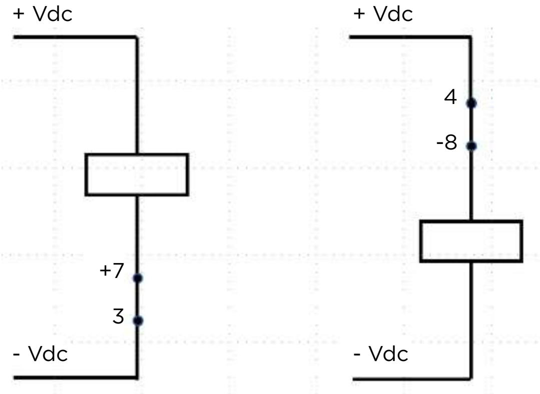


Two NO contacts

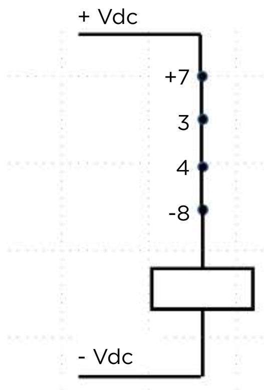


The load is disconected when the relay is de-energized

One NC contact

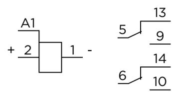
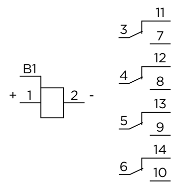
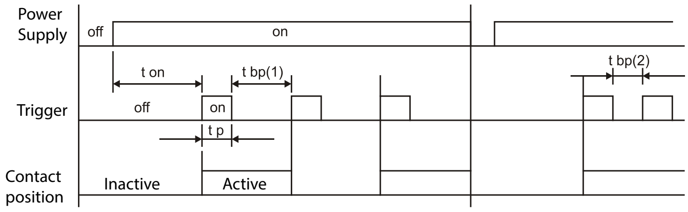


Two NC contacts in series



The load is disconected when the relay is energized

IMPULSE RELAY

Model	RBF-2 FF	RBF-4 FF
		
Applications	Latching relay with a single input and coil overvoltage protection. The state of the contacts changes with each input pulse. Auxiliary supply is needed.	
Construction characteristics		
Contacts no.	2 Changeover	4 Changeover
Connections	 **S 2-1** Supply voltage **C A1-1** Control voltage	 **S 1-2** Supply voltage **C B1-2** Control voltage
Operation Chart **t on:** Turn on time <= 30 ms. **t bp:** Minimum time between pulses, 30 ms. t bp(1)>= 30 ms t bp(2) < 30 ms **t p: Trigger minimum length, 3 ms** (max. 99 hours)		
Weight (g)	265	
Dimensions (mm)	(A) 42.5 x (B) 50.4 x (C) 96.6 (F large type)	
Coil characteristics		
Standard voltages[1]	24, 48, 72, 96, 110, 230 Vdc/Vac (50-60 Hz)	
Voltage range	+25% -30% U_N	
Pick-up / release voltage	See power supply-temperature charts for impulse relay	
Inductance at U_{nom}: Energized	10.5 ms	16.2 ms
Released	8.2 ms	10.8 ms
Average consumption in permanence (U_N)	3.1 W	4.5 W
Average consumption when coil not energized (U_N)	0.5 W	
Operating time		
Pick-up time	<23 ms	
Drop-out time	<40 ms	
Contacts		
Contact material	AgNi	
Contacts resistance[2]	≤15 mΩ	
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	
Minimum current / voltage	12 Vdc, 10 mA	
Max. making capacity	40 A, 0,5 s, 110 Vdc / 30 A, 1 s, 36 Vdc, 30,000 operations (1 op / 15 s)	
Breaking capacity	See breaking capacity curves (Contact gap= 1.2 mm)	
Max. breaking capacity	See value for 50,000 operations	
U_{max} opened contact	250 Vdc / 400 Vac	
General data		
Mechanical endurance	10^7 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	>1,000 MΩ	
Operating temperature	Up to 125 Vdc: -40°C+70°C / 230 Vdc: -40°C+55°C	
Storage temperature	-40°C+85°C	
Max. operating humidity	95%	
Operating altitude[3]	<2,000 m	

[1] Other voltage upon request
[2] Guarantee data for relays just manufactured
[3] Ask for higher altitudes

BREAKING CAPACITY

BREAKING CAPACITY

The breaking capacity is a critical parameter on the design and the applications of the relays. 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 a high breaking capacity values. These limits are showed in the table below, in terms of power and current values. In all the cases, these relays guarantee a right performance during 50,000 operations.

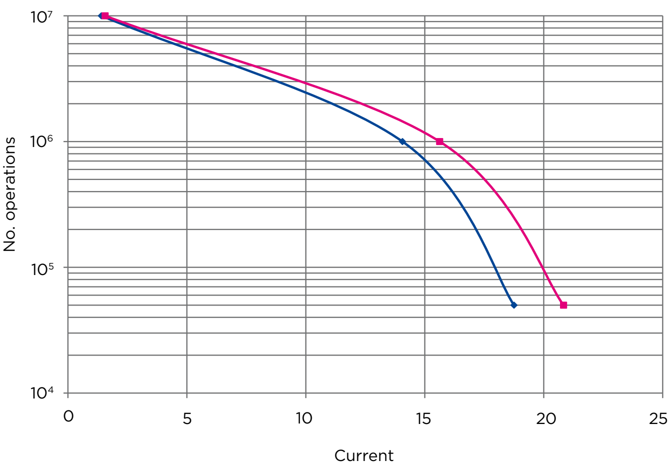
Likewise, the values showed in the following charts have been obtained in standard conditions in the laboratory, and they could be different in real conditions. In any case, the possibility of connecting serial contacts or a bigger distance between contacts makes these values to be considerably increased.

INSTANTANEOUS, LATCHING, TIMERS AND IMPULSE RELAYS

24 Vdc voltage
Different load configurations.

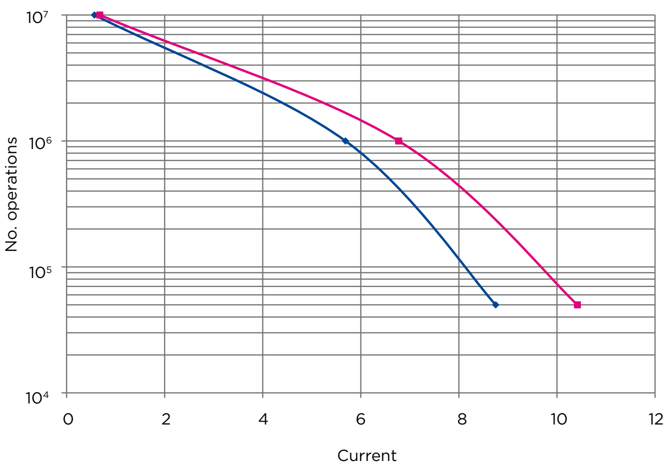
Resistive load:

- L/R= 0 ms.



Highly inductive load:

- L/R= 40 ms.



Contact gap= 1.8 mm
Contact gap= 1.2 mm

		0 ms		20 ms		40 ms	
Vdc	Contact configuration	P(W)	I(A)	P(W)	I(A)	P(W)	I(A)
24	Contact gap= 1.8 mm	500	20.83	370	15.42	250	10.42
	Contact gap= 1.2 mm	450	18.75	300	12.50	210	8.75

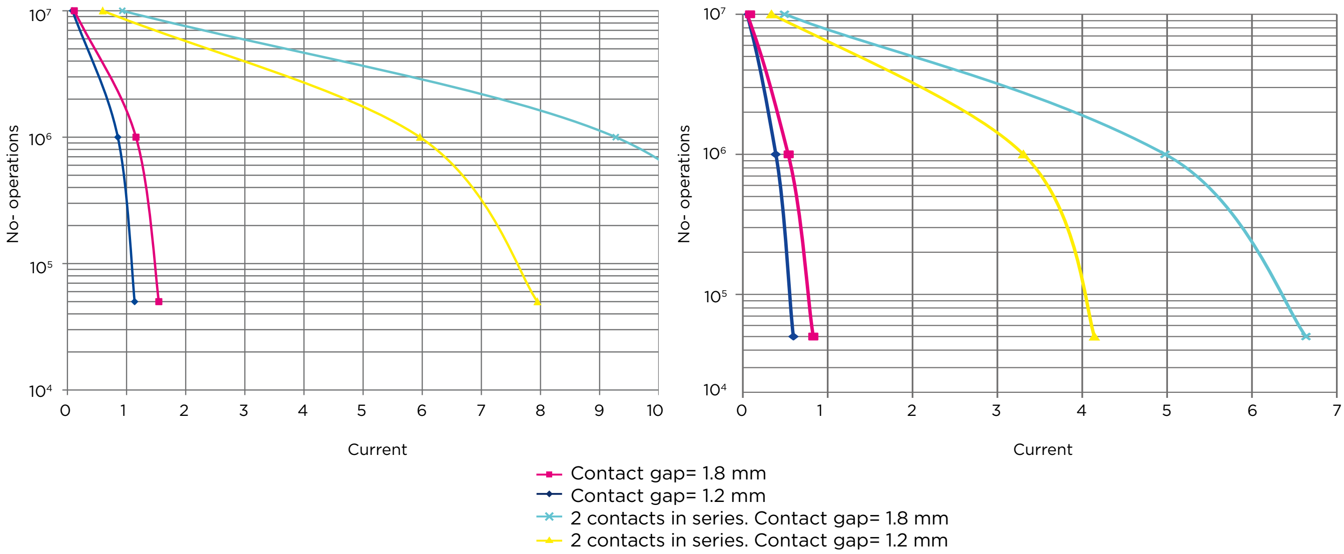
110 Vdc voltage
Different load configurations.

Resistive load:

› L/R= 0 ms.

Highly inductive load:

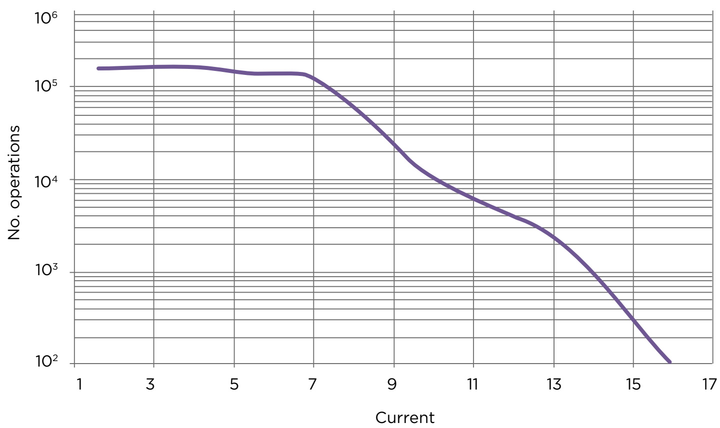
› L/R= 40 ms.



		0 ms		20 ms		40 ms	
Vdc	Contact configuration	P(W)	I(A)	P(W)	I(A)	P(W)	I(A)
110	Contact gap= 1.8 mm	170	1.55	140	1.27	90	0.82
	Contact gap= 1.2 mm	125	1.14	100	0.91	65	0.59
	2 contacts in series. Contact gap= 1.8 mm	1360	12.36	1106	10.05	730	6.63
	2 contacts in series. Contact gap= 1.2 mm	874	7.95	742	6.74	452	4.11

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 for relays with a 1.8 mm contact gap.
- Blue Curve: Breaking capacity for relays with a 1.2 mm contact gap.

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

HOW THE BREAKING CAPACITY CAN BE INCREASED

ARTECHE's auxiliary relays are power relays, designed specially to have a high breaking capacity. Thus, 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 have the following alternatives and recommendations:

- Possibility of external connection of equipment (serial contacts) getting an important increase of breaking capacity in these equipment is shown, guaranteeing the right performance during a high number of operations.
- Include the magnetic blow-out option: This option is indicated for safety applications (back-up) where the load values are extremely high. The mechanical life of the relay is reduced, but it is able to open very high loads for a certain number of operations.

These values of high breaking capacity are represented in the following table, where the high capacity of the output contacts of ARTECHE's auxiliary relays is proved.

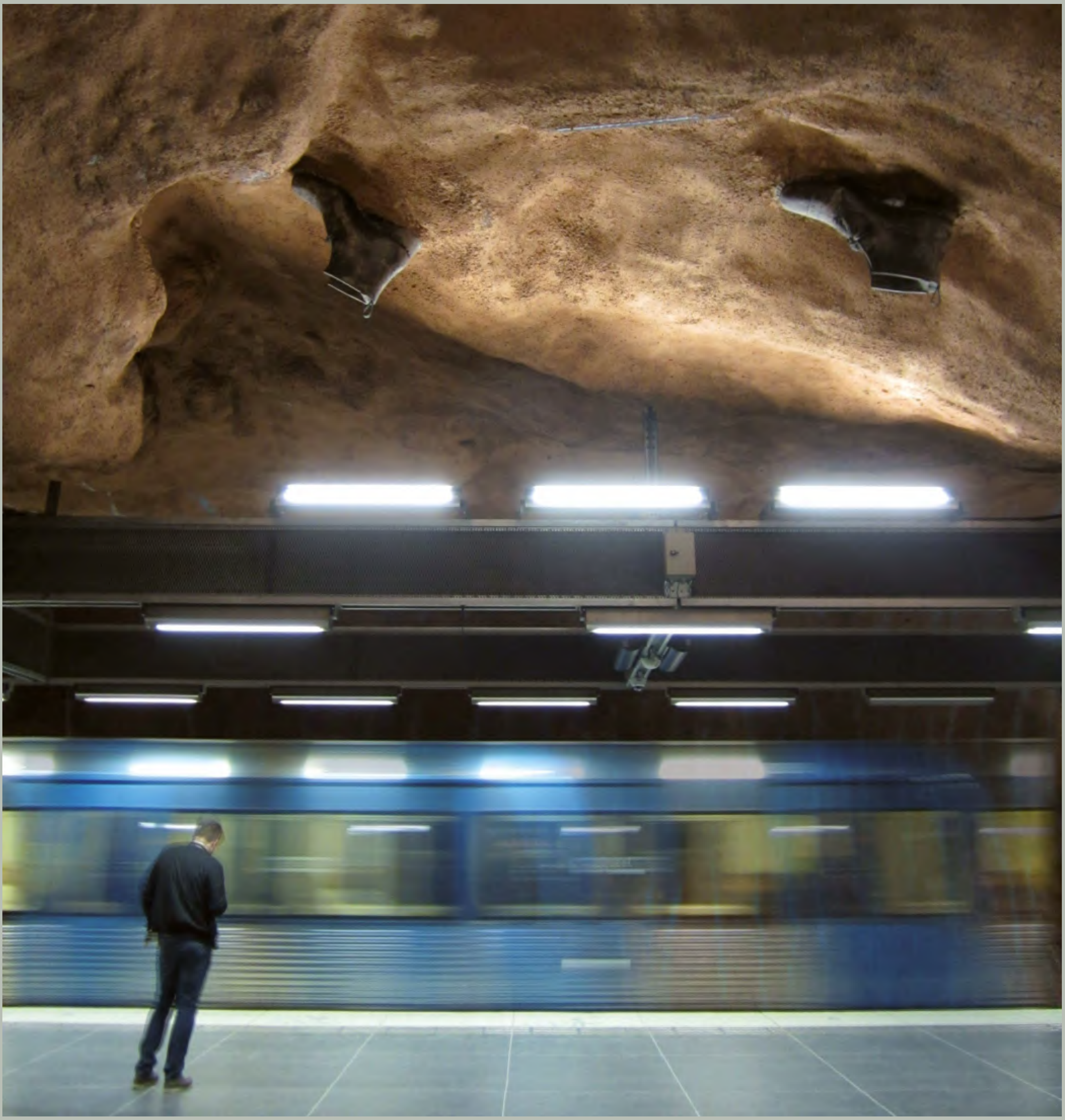
RELEVANT CONSIDERATIONS FOR RELAY STORAGE AND OPERATION

Long term storage, without making any operation and without connecting any load to the contacts, may sometimes lead to contact resistance increase. In normal operation, the mechanical cleaning (produced by the wiping effect of one contact against the other) and electrical cleaning (produced by the electrical load passing through the contacts) will reduce the contact resistance to optimum levels maintaining a good contact resistance all over the lifecycle of the relay.

Therefore, it is advisable to switch the working load several times before putting the relay into operation, so that the contacts are mechanically and electrically cleaned. If an increased contact resistance is observed, it is recommendable to perform several switching operations with a load of 1 A / 24 Vdc, thus providing an effective electrical cleaning which will reduce the contact resistance to optimum levels.

Similarly, switching **very low loads** and/or **infrequent relay operation** together with **environmental agents** may **increase contact resistance. If issues arise when the relay is operating under this scenario, please contact Arteche for further asistance.**

PICK-UP VOLTAGE/RELEASE VOLTAGE-TEMPERATURE CHARTS

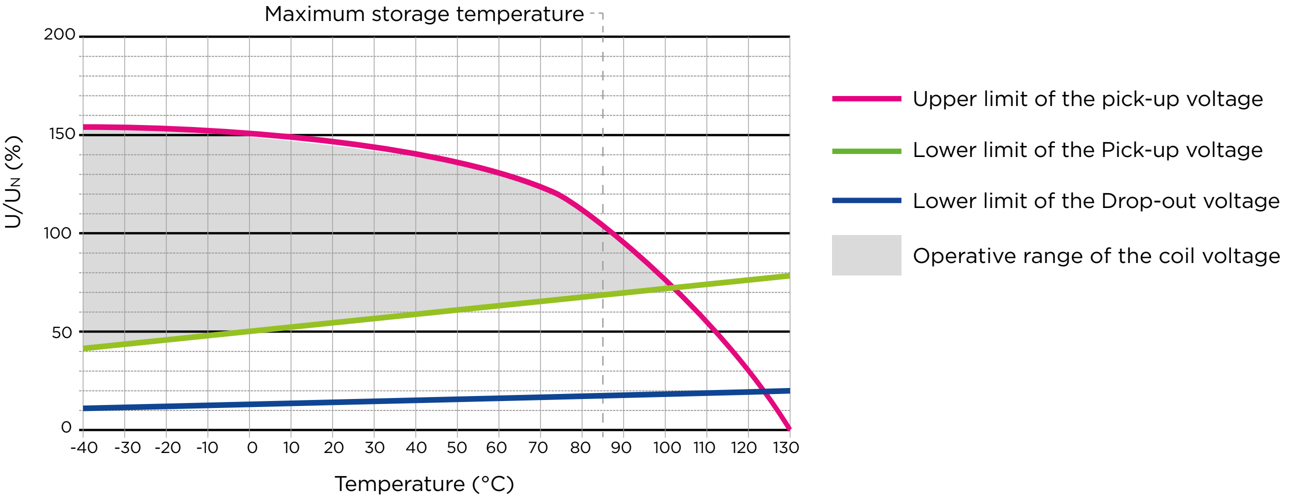


INSTANTANEOUS RELAYS AND CONTACTORS

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

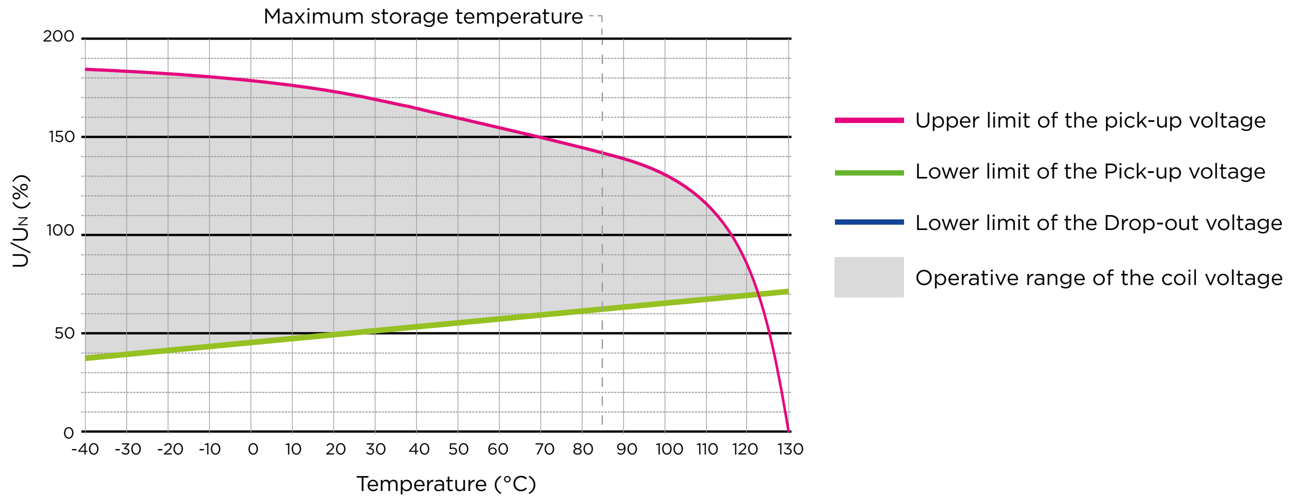


LATCHING RELAYS

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

GENERAL PURPOSE LATCHING RELAYS AND LATCHING RELAYS WITH COIL OVERVOLTAGE PROTECTION

Operative range against ambient temperature

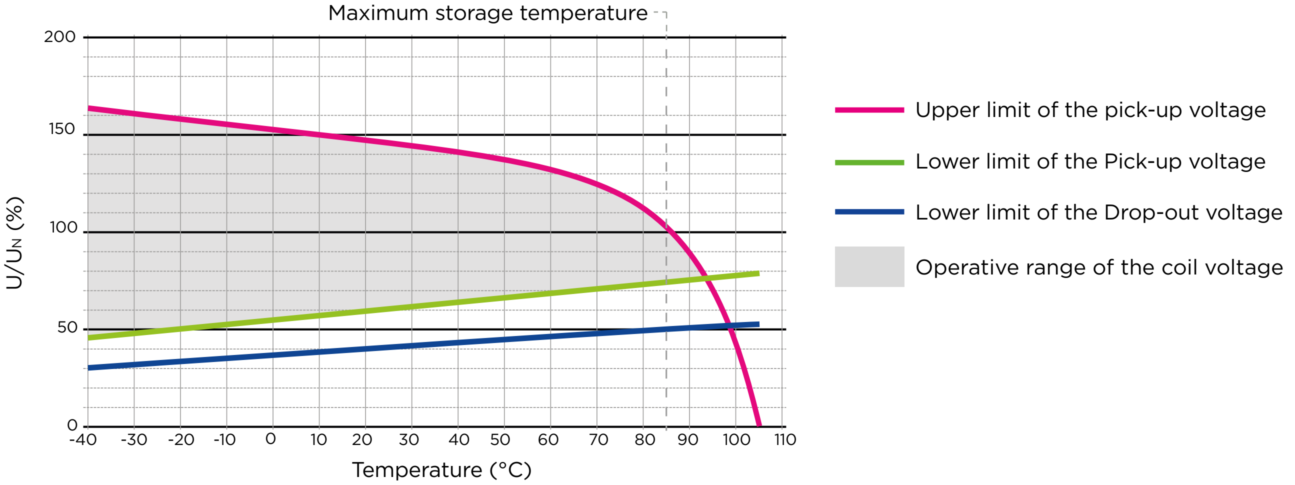


TIMER RELAYS AND IMPULSE RELAY

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

TIMER AND IMPULSE RELAYS

Operative range against ambient temperature



MODEL SELECTION

Instantaneous 2 contacts	Type	Range	Aux. Supply Vdc or Vac		Options					
Model Selection	**RD-2SY**			**OP**	**0**			**0**		**FF**
General purpose range										
2 contacts relay	RD-2SY				0*	0	0	0*	0	Standard model
With coil overvoltage protection										
Freewheeling diode in parallel with the coil		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										
Led option makes the relay model work with any polarity in the coil										
Front LED [1]	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

[1] Option available on relays with coil overvoltage protection

arteche

MODEL SELECTION

Instantaneous 4-8 contacts

Model Selection		Type	Range	Aux. Supply Vdc or Vac	OP	0			0		FF	
General purpose range												
4 contacts relay		RF-4SY				0*	0	0	0*	1		Standard model
8 contacts relay		RJ-8SY				0*	0	0	0*	1		Standard model
With coil overvoltage protection range												
Freewheeling diode in parallel with the coil			DI			0*	0	0	0*	1		Standard model
Varistance in parallel with the coil			V			0*	0	0	0*	1		Standard model
Aux. Supply Vdc or Vac												
Aux. Supply Vdc or Vac Indicate voltage level and if it is Vdc or Vac (ex: 24 Vdc)												
Options												
Front LED (1)	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

(1) Option available on relays with coil overvolatge protection

Latching

Model Selection	Type	Range	Aux. Supply Vdc or Vac	FF
General purpose range				
3 contacts relay	BF-3			
4 contacts relay	BF-4			
8 contacts relay	BJ-8			
Options				
Freewheeling 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)				

MODEL SELECTION

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*	Standard model
Relay with 2 instantaneous contacts + 2 timer contacts	TDF-22			0*	0	0*	Standard model
Relay with 8 timer contacts	TDJ-8			0*	0	0*	Standard model
Relay with 4 instantaneous contacts + 4 timer contacts	TDJ-44			0*	0	0*	Standard model

Aux. Supply

Indicate voltage level (ex.: 24 Vdc/Vac)

Options

Command sign voltage	Dependent Standard		0
	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

*Mandatory option

Timers (pick up time)	Type	Timer time	Range	Aux. Supply Vdc or Vac	
Model selection ▶▶					FF
Contactor type					
Relay with 4 timer contacts	TDF-4DO				
Timer					
Fixed: between 0 and 1,000 ms **Except for 72 VDC that would be between 0-800 ms*		F	XXXM		
Variable (with potentiometer): 0-500 ms 100-600 ms 200-700 ms* *(limit of coil 72 VDC)* 300-800 ms 400-900 ms 500-1,000 ms and intermediate combinations, with steps up 500 ms			YYYM		
Aux. supply Vdc					
Indicate voltage level (ex: 24 Vdc)					

XXXM: Specify the fixed time between 0 and 1,000 ms

YYYM: Specify the upper limit of the selected timing range

MODEL SELECTION

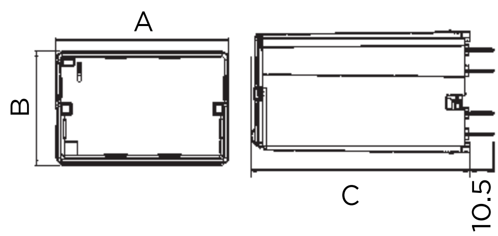
Contactors (Instantaneous)	Type	Aux. Supply Vdc	
Model selection ▶▶			FF
General purpose range			
2 contacts contactor	CD-2		
4 contacts contactor	CF-4		
8 contacts contactor	CJ-8		
Aux. Supply Vdc			
Indicate voltage level (ex: 24 Vdc)			

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.: 24 Vdc)			

*Mandatory option

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	Universal (Bag of 20 units)
			Universal (Bag of 100 units)
E41	DN DE IP FF, DN DE 2C IP FF, D DE CL IP20 FF	RD OP FF	
E50	DN TR OP FF, DN TR 2C OP FF	RD OP FF	
E40	FN DE IP FF, FN DE 2C IP FF, F DE CL IP20 FF	RF OP FF	
E43	FN DE IP FF, FN DE 2C IP FF F DE CL IP20 FF	TDF OP; RBF FF	
E42	FN TR OP FF, FN TR 2C OP FF	RF OP FF	
E44	FN TR OP FF, FN TR 2C OP FF	TDF OP; RBF FF	
E31	FN DE IP FF, FN DE 2C IP FF F DE CL FF	BF FF	
E21	FN TR OP FF, FN TR 2C OP FF	BF FF	
E45	JN DE IP FF, JN DE 2C IP FF, J DE CL IP20 FF	RJ OP FF	
E47	JN DE IP FF, JN DE 2C IP FF J DE CL IP20 FF	TDJ OP FF	
E46	JN TR OP FF, JN TR 2C OP FF	RJ OP FF	
E48	JN TR OP FF, JN TR 2C OP FF	TDJ OP FF	
E29	JN DE IP FF, JN DE 2C IP FF, J DE CL IP20 FF	BJ; UJ FF	
E27	JN TR OP FF, 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

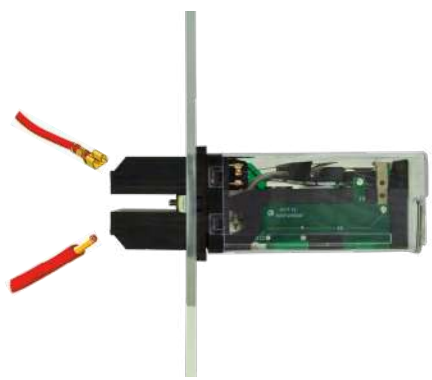
SOCKETS, DIMENSIONS AND CUT-OUT

Sockets		Screw	Doble faston	Weight (g)	Clamp	Weight (g)
Relay	Type					
D	IP10 Front connection	DN DE IP10 FF	DN DE2C IP10 FF	65 / 60		
	IP20 Front connection	DN DE IP20 FF	DN DE2C IP20 FF	65 / 45	D DE CL IP20 FF	85
	Rear connection	DN TR OP FF	DN TR2C OP FF	50 / 40		
F	IP10 Front connection	FN DE IP10 FF	FN DE2C IP10 FF	120 / 110		
	IP20 Front connection	FN DE IP20 FF	FN DE2C IP20 FF	125 / 90	F DE CL IP20 FF	145
	Rear connection	FN TR OP FF	FN TR2C OP FF	100 / 75		
J	IP10 Front connection	JN DE IP10 FF	JN DE2C IP10 FF	225 / 220		
	IP20 Front connection	JN DE IP20 FF	JN DE2C IP20 FF	220 / 175	J DE CL IP20 FF	250
	Rear connection	JN TR OP FF	JN TR2C OP FF	200 / 140		

Accesories
Retaining clips
Function signs on the extraction ring
Security pins (*)

(*) Not availble for latching relays

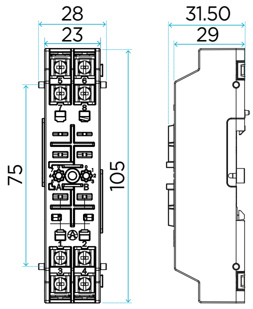
› Front connection socket



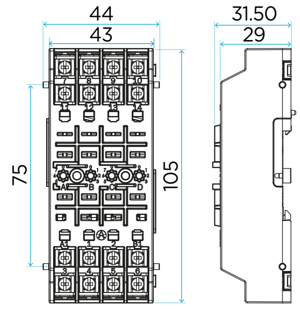
› Rear connection socket

	Relays type D	Relays type F	Relays type J
Sockets for DIN rail (1) (2)	DN DE IP10 FF • DN DE2C IP10 FF	FN DE IP10 FF • FN DE2C IP10 FF	JN DE IP10 FF • JN DE2C IP10 FF

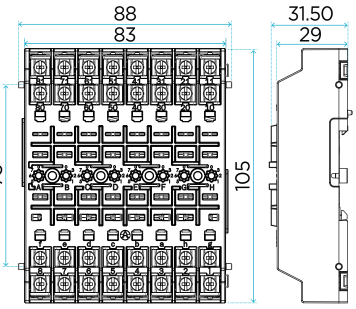
DN DE IP10 FF • DN DE2C IP10 FF



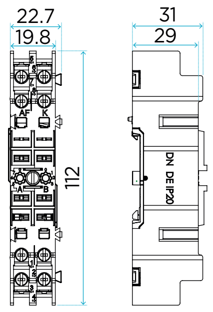
FN DE IP10 FF • FN DE2C IP10 FF



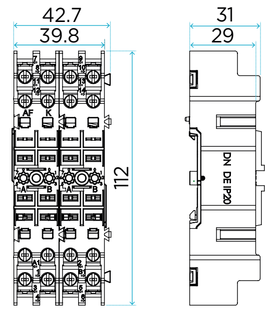
JN DE IP10 FF • JN DE2C IP10 FF



DN DE IP20 FF • DN DE2C IP20 FF



FN DE IP20 FF • FN DE2C IP20 FF



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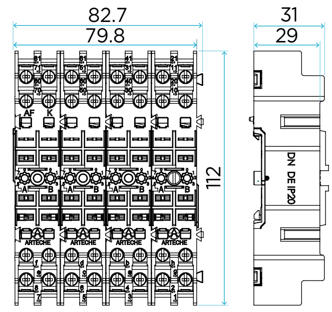
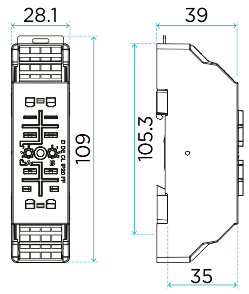
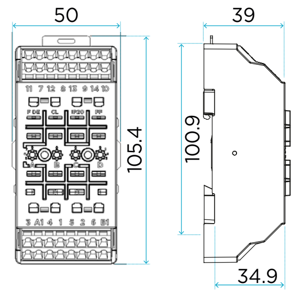


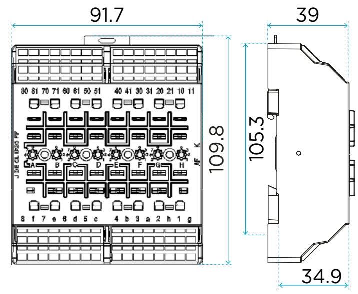
D DE CL IP20 FF



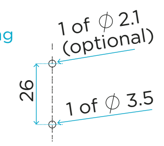
F DE CL IP20 FF



J DE CL IP20 FF



Fix Drilling



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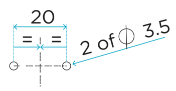
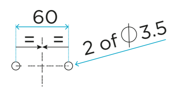
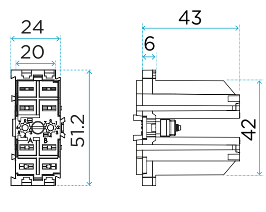


Fix Drilling

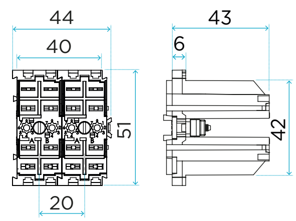


Sockets for rear connection

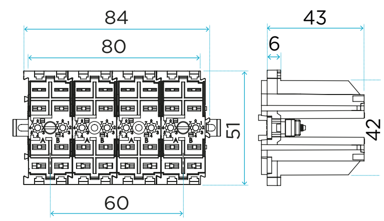
DN TR OP FF • DN TR2C OP FF



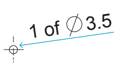
FN TR OP FF • FN TR2C OP FF



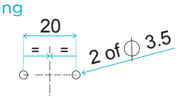
JN TR OP FF • JN TR2C OP FF



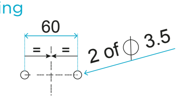
Fix Drilling



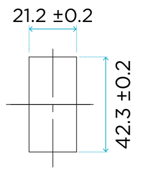
Fix Drilling

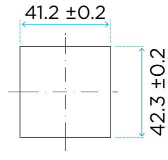


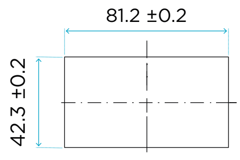
Fix Drilling



Cut-out







(1) The sockets can be installed on the TS35 DIN rail (symmetrical 35 mm x 7.5 mm, 1 mm thick according to EN 50022, BS 5584, DIN 46277-3).

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

arteche
Moving together

Updates: ARTECHE_CT_Auxiliary-Relays-Railway-Sector_EN
Version: 2.9