



Bulletin 700-CF — Control Relay

- IEC industrial relays
- Mechanically linked contact performance per IEC 60947-5-1
- Gold plated, bifurcated version for low level switching applications
- Master control relay version rated 15 A (AC-15)
- Solid-state and pneumatic timing modules
- 4-...10 Poles

Certifications

cULus Listed (File No. E14840, Guide NKCR/NKCR7)
CE Marked
CCC Certified

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Standards Compliance
UL 508
CSA C22.2 No. 14
EN/IEC 60947-1, -5-1
Meets the material restrictions
for European Directive
2002/95/EC - EU-RoHS

4-Pole AC Coil Voltage (Ratings for 700-CF Only)

AC-12		AC-15							Connection Diagrams	Contacts		Standard Contacts Cat. No.*	Gold Plated Bifurcated Contacts Cat. No.*	Master Contacts Cat. No.*
I_{th} [A]		I_e [A]												
40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V		N.O.	N.C.			
20	20	10	10	10	6	2.5	1	1		2	2	700-CF220⊗	700-CFB220⊗	700-CFM220⊗
										3	1	700-CF310⊗	700-CFB310⊗	700-CFM310⊗
										4	0	700-CF400⊗	700-CFB400⊗	700-CFM400⊗
										0	4	700-CF040⊗	700-CFB040⊗	—

* For spring clamp terminals, insert **R** after 700-C. Example: **Cat. No. 700-CRF220D**.

⊗ AC Coil Voltage Code

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: **Cat. No. 700-CF220*** becomes **Cat. No. 700-CF220D** for 120V, 60 Hz

[V]	12	24	32	36	42	48	100	100 ...	110	120	127	200	200 ...	208	208 ...	220 ...	230	230 ...	240	277	347	380	380 ...	400	400 ...	440	480	500	550	600	
50 Hz	R	K	V	W	X	Y	KP	—	D	P	S	KG	L	—	240	—	F	—	VA	T	—	—	—	N	—	G	B	—	M	C	—
60 Hz	Q	J	—	V	—	X	—	KP	—	D	—	—	KG	H	L	—	—	—	A	T	I	E	—	—	—	N	B	—	—	—	C
50/60 Hz	—	KJ	—	—	—	KY	KP	—	KD	—	—	KG	KL	—	—	KL	KF	—	KA	—	—	—	—	KN	—	KB	—	—	—	—	

4-Pole DC Coil Voltage (Ratings for 700-CF Only)

AC-12		AC-15							Connection Diagrams	Contacts		Standard Contacts Cat. No.*	Gold Plated Bifurcated Contacts Cat. No.*	Master Contacts Cat. No.*
I_{th} [A]		I_e [A]												
40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V		N.O.	N.C.			
20	20	10	10	10	6	2.5	1	1		2	2	700-CF220⊗	700-CFB220⊗	700-CFM220⊗
										3	1	700-CF310⊗	700-CFB310⊗	700-CFM310⊗
										4	0	700-CF400⊗	700-CFB400⊗	700-CFM400⊗

† For spring clamp terminals, insert **R** after 700-C. Example: **Cat. No. 700-CRF220ZJ**.

* Ratings for Bulletin 700-CFB and 700-CFM are on page 9-159

⊗ DC Coil Voltage Code§

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. example: **Cat. No. 700-CF220*** becomes **Cat. No. 700-CF220ZJ** for 24V DC

[V]	9	12	24	36	48	48... 72	60	64	72	80	110	110... 125	115	125	220	220... 250	230	250
Standard	ZR	ZQ	ZJ	ZW	ZY	—	ZZ	ZB	ZG	ZE	ZD	—	ZP	ZS	ZA	—	ZF	ZT
Standard diode	—	—	DJ	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electronic with diode	—	EQ	EJ	—	—	EY	—	—	—	—	—	ED	—	—	—	EA	—	—

§ When ordering DJ coil with built-in surge suppression, the DJ is not polarity sensitive. Drop out time: 14...20 ms.

Bulletin 700-CF, 700-CFB, 700-CFM
IEC Industrial Control Relays
 Specifications

General

		Main Relay Cat. Nos. 700-CF, 700S- CF	Front Mounted Standard Auxiliary Contacts	Main Relay Cat. No. 700-CFB, 700S- CFB	Master Relay Cat. No. 700-CFM	Front Mounted Bifurcated Auxiliary Contacts	Side-mounted Auxiliary Contacts
Contact Ratings — NEMA		A600, P600	A600, Q600	A600, Q600	2 x A600, P600	A600, Q600	A600, Q600
Min. Contact Rating		17V, 10 mA	17V, 5 mA	8V, 5 mA	—	5V, 3 mA	17V, 10 mA
Contact Ratings — IEC AC-15 (solenoids, contactors) at rated voltage IEC 60947-5-1	24V	10 A	6 A	3 A	15 A	3 A	6 A
	48V	10 A	6 A	3 A	15 A	3 A	6 A
	120V	10 A	6 A	3 A	15 A	3 A	6 A
	240V	10 A	5 A	3 A	15 A	3 A	5 A
	400V	6 A	3 A	2 A	7.5 A	2 A	3 A
	480V/500V	2.5 A	1.6 A	1.2 A	5 A	1.2 A	1.6 A
	600V	1 A	1 A	0.7 A	2 A	0.7 A	1 A
AC-12 (Control of resistive loads) IEC 60947-5-1	40 °C	Ith	20 A	10 A	20 A	10 A	10 A
		230V	8 kW				
		400V	14 kW				
		690V	24 kW				
	60 °C	Ith	20 A	6 A	20 A	6 A	6 A
		230V	8 kW				
		400V	14 kW				
		690V	24 kW				
DC-12 Switching DC Loads L/R < 1ms, Resistive Loads IEC 60947-5-1	24V	15 A	10 A	6 A	20 A	6 A	6 A
	48V	10 A	9 A	3.2 A	20 A	3.2 A	3.2 A
	110V	6 A	3.5 A	1 A	8 A	1 A	1 A
	220V	1 A	0.7 A	0.5 A	1.5 A	0.5 A	0.5 A
	440V	0.4 A	0.2 A	0.2 A	0.4 A	0.2 A	0.2 A
DC-13 IEC 60947-5-1, Solenoids and contactors	24V	5 A	5 A	2.5 A	5 A	2.5 A	5 A
	48V	3 A	3 A	1.5 A	3 A	1.5 A	2.5 A
	110V	1.2 A	1.2 A	0.6 A	1.2 A	0.6 A	0.68 A
	220V	0.6 A	0.6 A	0.3 A	0.6 A	0.3 A	0.32 A
	440V	0.3 A	0.15 A	0.15 A	0.3 A	0.15 A	0.15 A

	Location of welded N.O. contacts	State of N.C. Contacts if N.O. contact welds		
	Main	Main	Front aux.	Side aux.
Mechanically Linked Contacts*	Front aux.	Open	Open	Open*
		Open	Open	—

* Side mounted auxiliary contacts provide “mirror contact” performance with main poles only.

* Defined in IEC 60947-5-1 annex L. Mechanically linked is a relationship between contacts of opposite types (i.e., N.O. and N.C.).

			Cat. No. 700-CF	Aux./Pneu matic Timer Contact (Front- mounted)
Mechanical Life		[Mil]	15	5
Electrical Life	AC-15 (240V, 3 A)	[Mil]	1.5	1.5
Weight	AC Coil	[g]	390	—
Terminal Cross-Sections				
Terminal Type				
Terminal Size per IEC60 947-1		2 x A4	2 x A4	
	Solid/ Stranded	1 Conductor	[mm²]	1.5...6
	§	2 Conductor	[mm²]	0.5...2.5
Max. Wire Size per UL/CSA		[AWG]	16...10	18...14
Tightening Torque		[lb-in]	13.3...22	8.9...13.3
Tightening Torque		[N-m]	1.5...2.5	1...1.5

§ For 16 or more strands, end ferrule is required.

DC Switching Ratings for 700-CF Main Poles in Series (Resistive Load at 60 °C)			
	1 pole	2 poles	3 poles
24/48V	25/20 A	25 A	25 A
125V	6 A	25 A	25 A
220V	1.5 A	8 A	25 A
440V	0.4 A	1 A	3 A

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Control Circuit

			Cat. No. 700-CF
Operating Voltage			
AC 50/60 Hz	Pickup	[x U _s]	0.85...1.1
	Dropout	[x U _s]	0.3...0.6
DC*	Pickup	[x U _s]	0.8...1.1
	Dropout	[x U _s]	0.1...0.6
Coil Consumption			
AC 50/60 Hz	Inrush	[VA/W]	70/50
	Seal	[VA/W]	8/2.6
DC (conventional)	Inrush/Seal	[W]	6.5
DC (electronic)	Inrush (avg./peak)	[W]	10/17
	Seal	[W]	1.7
Operating Times			
AC 50/60 Hz	Pickup Time	[ms]	15...30
	Dropout Time	[ms]	10...60
DC (conventional)	Pickup Time	[ms]	40...70
	Dropout Time	[ms]	7...15
DC (electronic)	Pickup Time	[ms]	25...50
	Dropout Time	[ms]	25...50
Min OFF time		[ms]	200
Max. ripple			± 15%
Latch Attachment Release, 100-FL			
Coil Consumption	AC	[VA/W]	45/40
	DC	[W]	25
Contact Signal Duration		[min./max]	0.03...15 s
Timing Attachment			
Reset Time, 100-ETA, 100-ETB	at min. time setting	[ms]	10
	at max. time setting	[ms]	70
Repeat Accuracy			± 10%

* For 9V DC, code ZR, use operating voltage 0.65...1.3 x U_s.
For 24V DC, code ZJ, DJ, or EJ use operating voltage 0.7...1.25 x U_s.
For 110V DC, code ED use operating voltage 0.7...1.25 x U_s.

General

		Cat. No. 700-CF
Rated Insulation Voltage U_i		
IEC		690V
UL; CSA		600V
Rated Impulse Strength U_{imp}		6 kV
High Test Voltage 1 minute (per IEC 60947-4)		2500V
Rated Voltage U_e		
AC		115, 230, 400, 500, 690V
DC		24, 48, 110, 220, 440V
Short-Circuit Protection gG Fuse 10 A		
Rated Frequency		50/60 Hz, DC
Ambient Temperature		
Storage		-55...+80 °C (-67...176 °F)
Operation at nominal current		-25...+60 °C (-13...140 °F)
15% current reduction for AC-12 at > 60 °C		-25...+70 °C (-13...158 °F)
Corrosion Resistance		humid-alternating climate, cyclic, per IEC 60068-2-30 and DIN 50 016, 56 cycles
Altitude		2000 m above mean sea level, per IEC60 947-4
Type of Protection		
IP2X (IEC 60529 and DIN 40050)		in connected state
Shock Resistance		IEC 60068-2: Half sinusoidal shock 11 ms, 30 G (in 3 directions)
Vibration Resistance		IEC 60068-2: Static >2 G, in normal position no malfunction <5 G

Utilization Category Table from EN 60947-5-1

Verification of Making and Breaking Capacities of Switching Elements Under Normal Conditions Corresponding to the Utilization Categories*									
Utilization Category	Normal Condition of Use								
	Make‡			Break‡			Number and Rate of Making and Breaking operations		
	I/I _e	U/U _e	cos ψ	I/I _e	U/U _e	cos ψ	No. operating cycles§	Operating cycles per minute	ON time [s]►
AC-12⌘	1	1	0.9	1	1	0.9	6050	6	0.05
AC-13⌘	2	1	0.65	1	1	0.65	6050	6	0.05
AC-14⌘	6	1	0.3	1	1	0.3	6050	6	0.05
AC-15⌘	10	1	0.3	1	1	0.3	6050	6	0.05
DC	—	—	T _{0.95}	—	—	T _{0.95}	—	—	—
DC-12	1	1	1 ms	1	1	1 ms	6050	6	0.05►
DC-13	1	1	6 x P⌘	1	1	6 x P⌘	6050	6	0.05►
DC-14⌘	10	1	15 ms	1	1	15 ms	6050	—	0.05►

I_e Rated operational current, I Current to be made or broken

U_e Rated operational voltage, U Voltage before make

P_{U_eI_e} Steady-state power consumption (W)

T_{0.95} Time to reach 95% of the steady-state current (ms)

* See sub-clause 8.3.3.5.2.

‡ For tolerances on test quantities, see sub-clause 8.3.2.2.

§ The first 50 operating cycles shall be run at U/U_e=1.1 with the loads set at U_e.

⌘ The value "6 x P" results from an empirical relationship which is found to represent most DC magnetic loads to an upper limit of P = 50 W, e.g., 6 x P= 300 W.

► The ON time shall be at least equal to T_{0.95}.

⌘ Where the break current differs from the make current value, the ON time refers to the make current value after which the current is reduced to the break current value for a suitable period e.g., 0.05 s.



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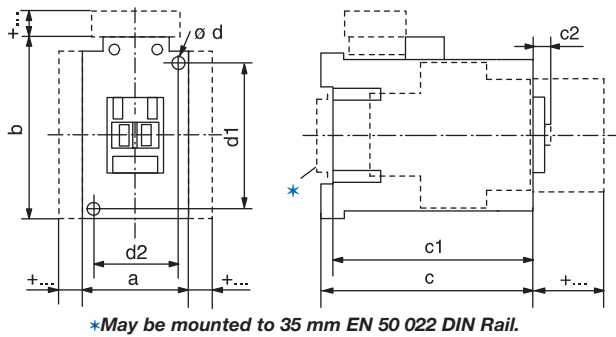
www.ab.com/catalogs Preferred availability cat. nos. are **bold**.

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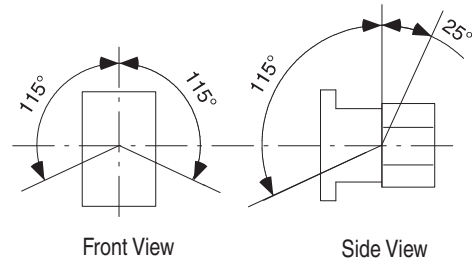
Bulletin 700-CF, 700-CFB, 700-CFM
IEC Industrial Control Relays
 Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended for manufacturing purposes.

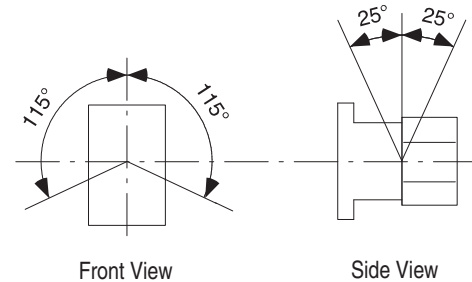
Mounting Position



AC and DC Control Relay with DC Electronic Coil



DC Control Relay



AC and DC Control Relays with 12V or 24V DC Electronic Coil

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	81 (3-3/16)	80.5 (3-11/64)	75.5 (3-3/32)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

DC Control Relays with 110V or 220V DC Electronic Coil

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	105 (4-1/8)	80.5 (3-11/64)	75.5 (3-3/32)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

DC Control Relays

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	81 (3-3/16)	106.5 (4-3/16)	101.5 (4)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

Accessories

Relay with		AC Control Relay		DC Control Relay	
		mm	(inches)	mm	(inches)
Auxiliary Contact for Front Mounting	2- or 4-pole	c/c1 + 39	(c/c1 + 1 – 37/64)	c/c1 + 39	c/c1 + 1 – 37/64)
Auxiliary Contact for Side Mounting	1- or 2-pole	a + 9	(a + 23/64)	a + 9	(a + 23/64)
Pneumatic Timing Module	—	c/c1 + 58	(c/c1 + 2 – 23/64)	—	—
Solid-state Timing Module	on coil terminal side	b + 24	(b + 15/16)	b + 24	(b + 15/16)
Mechanical Latching	—	c/c1 + 61	(c/c1 + 2 – 31/64)	—	—
DC Interface	on coil terminal side	b + 9	(b + 23/64)	—	—
Surge Suppressor	on coil terminal side	b + 3	(b + 1/8)	b + 3	(b + 1/8)
Labelling with:	label sheet	+0	(+0)	+0	(+0)
—	marking tag with cover	+0	(+0)	+0	(+0)
—	marking tag carrier for System V4/V5	+5.5	(+7/32)	+5.5	(+7/32)
—	marking tag carrier for System Bull. 1492W	+5.5	(+7/32)	+5.5	(+7/32)