

Bulletin 700-CF Control Relay



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

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

Certifications

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

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]								N.O.	N.C.			
40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V						
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⊗	—

* All Cat. Nos. are factory-stocked.

‡ 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	110	120	127	200	200... 220	208	208... 240	220... 230	230	230... 240	240	277	347	380	380... 400	400	400... 415	440	480	500	550	600
50 Hz	R	K	V	W	X	Y	KP	—	D	P	S	KG	L	—	—	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]									N.O.	N.C.			
40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V							
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⊗	

* All Cat. Nos. are factory-stocked.

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

* Ratings for Bulletin 700-CFB and 700-CFM are on Specifications

⊗ 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.

6- and 8-Pole Relays



Cat. No. 700-CFZ1420



Cat. No. 700-CFZ0530

Control Relays with Overlapping Side-Mounted Contacts

AC-12		AC-15								Left Aux.	Relay Arrangement	Right Aux.	Contacts		Overlapping Side-Mounted Contacts		Cat. No.
I_{th} [A]		I_e [A]											N.O.	N.C.	N.O.	N.C.	
40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V									
Main Relay	20	20	10	10	10	6	2.5	1	1		4	0	1	1	700-CFZ1510⊗		
											3	1	1	1	700-CFZ1420⊗		
Side Contacts	10	10	6	6	5	3	1.6	1	1		2	2	1	1	700-CFZ1330⊗		
											4	0	2	2	700-CFZ2620⊗		
											3	1	2	2	700-CFZ2530⊗		
											2	2	2	2	700-CFZ2440⊗		

Control Relays with Standard Side-Mounted Contacts

AC-12			AC-15							Left Aux.	Relay Arrangement	Right Aux.	Contacts		Standard Side-Mounted Contacts		Cat. No.
I_{th} [A]			I_e [A]										N.O.	N.C.	N.O.	N.C.	
	40 °C	60 °C	24/48V	120V	240V	400V	500V	600V	690V								
Main Relay	20	20	10	10	10	6	2.5	1	1		4	0	1	1	700-CFZ0510		
											3	1	1	1	700-CFZ0420		
												2	2	1	1	700-CFZ0330	
Side Contacts	10	10	6	6	5	3	1.6	1	1		4	0	2	2	700-CFZ0620		
											3	1	2	2	700-CFZ0530		
											2	2	2	2	700-CFZ0440		

* All Cat. Nos. are factory stocked.

⊗ 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-CFZ0510** becomes **Cat. No. 700-CFZ0510F**.

[V]	12	24	32	36	42	48	100	100... 110	110	120	127	200	200... 220	208	208... 240	220... 230	230	230... 240	240	277	347	380	380... 400	400	400... 415	440	480	500	550	600
50 Hz	R	K	V	W	X	Y	KP	—	D	P	S	KG	L	—	—	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	—	—	—	


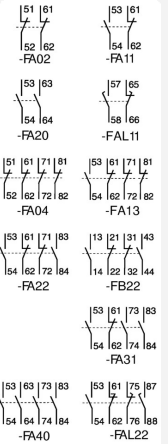
Assignment of Contacts

Device Combinations in Accordance with IEC 60947-1 / -4-1


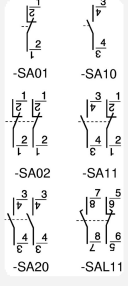
Auxiliary Contact Blocks		Control Relays 700-CF (AC and DC Control)				
	Circuit Diagram	Control	700-CF⊗220	700-CF⊗310	700-CF⊗400	
Front Mounting *						
100-FA02		AC/DC	22E + 02E = 24Y	31E + 02E = 33Y	40E + 02E = 42Y	
100-FA11		AC/DC	22E + 11E = 33Y	31E + 11E = 42Y	40E + 11E = 51Y	
100-FA20		AC/DC	22E + 20E = 42Y	31E + 20E = 51Y	40E + 20E = 60Y	
100-FA22		AC/DC	22E + 22E = 44Y	31E + 22E = 53Y	40E + 22E = 62Y	
100-FA31		AC/DC	22E + 31E = 53Y	31E + 31E = 62Y	40E + 31E = 71Y	
100-FA40		AC/DC	22E + 40E = 62Y	31E + 40E = 71Y	40E + 40E = 80Y	
100-FAL22		AC/DC	22E + L22E = L44Y	31E + L22E = L53Y	40E + L22E = L62Y	

* Control relay and auxiliary contact block AC/DC max. 4 N. C.

Auxiliary Contacts

Description	N.O.	N.C.	Connection Diagrams	For Use With	Standard Contacts†	Bifurcated Contacts
					Cat. No.	Cat. No.
 Auxiliary Contact Blocks for Front Mounting 2- and 4-pole Quick and easy mounting without tools Electronic-compatible contacts down to 17V, 5 mA Mechanically linked performance between N.O. and N.C. poles and to the main relay poles (except for L types) Models with equal function with several terminal numbering choices 1L = Late break N.C./early make N.O. Bifurcated version for switching down to 5V, 3 mA	0	2		700-CF	100-FA02	100-FAB02
	1	1		100-FA11	100-FAB11	
	2	0		100-FA20	100-FAB20	
	1L	1L		100-FAL11	—	
	0	4		100-FA04	100-FAB04	
	1	3		100-FA13	100-FAB13	
	2	2		100-FA22	100-FAB22	
	3	1		100-FA31	100-FAB31	
	4	0		100-FA40	100-FAB40	
	1+1L	1+1L		100-FAL22	—	

† For spring clamp terminals, insert CR after 100-. Example: Cat. No. 100-CRFA02.

Description	N.O.	N.C.	Connection Diagrams	For Use With	Cat. No.
 Auxiliary Contact Blocks for Side Mounting without Sequence Terminal Designations 1- and 2-pole Two-way numbering for right or left mounting on the contactor Quick and easy mounting without tools Electronic-compatible contacts down to 17V, 10 mA Mirror contact performance to the main relay poles 1L = Late break N.C./early make N.O.	0	1		700-CF	100-SA01
	1	0		100-SA10	
	0	2		100-SA02	
	1	1		100-SA11	
	2	0		100-SA20	
	1L	1L		100-SAL11	

‡ For maximum no. of contacts: Refer to the following tables.

700-CF (AC and DC electronic coils), vertical mounting, 60 °C †							
Cat. No.	Max. N.O. Side Aux.	Max. N.C. Side Aux.	Max. N.O. Front Aux.	Max. N.C. Front Aux.	Max. N.O. Front + Side Aux.	Max. N.C. Front + Side Aux.	Max. N.O. + N.C. Front + Side Aux.
CF400	2	4	4	4	6	7	8
CF310	2	4♣	4	4Δ	6	5	8
CF220	4	4♣	4	2	8	5	8
CF040	2	2	4	0	6	2	6

♣ With no front auxiliary contacts installed. Otherwise 3 N.C. Maximum

Δ With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum

♦ For other operating conditions, please contact your local Rockwell Automation sales office or AllenBradley distributor.







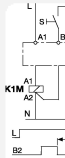
700-CF (DC conventional coils), vertical mounting, 60 °C †							
Cat. No.	Max. N.O. Side Aux.	Max. N.C. Side Aux.	Max. N.O. Front Aux.	Max. N.C. Front Aux.	Max. N.O. Front + Side Aux.	Max. N.C. Front + Side Aux.	Max. N.O. + N.C. Front + Side Aux.
CF400	2	2	4	4Δ	6	5	8
CF310	2	2	4	4Δ	6	5	8
CF220	2	2	4	2	6	4	8

Δ With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum


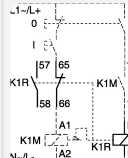
♦ For other operating conditions, please contact your local Rockwell Automation sales office or AllenBradley distributor.

♦ Side or front mounted auxiliary contacts only, not both.





Control Modules

	Description	Connection Diagrams	Reset Time	Repeat Accuracy	Delay	For Use With	Cat. No.
	Pneumatic Timing Modules* ON-Delay Pneumatic timing element contacts switch after the delay time. The contacts on the main control relay continue to operate without delay.		25...90 ms for AC Coils 47...85 ms for DC coils	+/-10%	0.3...30 s	700-CF all*	100-FPTA30
					1.8...180 s		100-FPTA180
	Pneumatic Timing Modules OFF-Delay Pneumatic timing element contacts switch after the delay time. The contacts on the main control relay continue to operate without delay.		100 ms	+/-1%	0.3...30 s	700-CF 110...240V AC 110...250V DC conventional coils	100-FPTB30
					1.8...180 s		100-FPTB180
	Electronic Timing Modules – On-Delay Delay of the control relay coil assembly. The control relay is energized at the end of the delay time.		100 ms	+/-1%	0.1...3 s	700-CF 110...240V AC 110...250V DC conventional coils	100-ETA3
					1...30 s		100-ETA30
					10...180 s	700-CF 24...48V DC coils	100-ETA180
					0.1...3 s		100-ETAZJ3
1...30 s	100-ETAZJ30						
10...180 s	100-ETAZJ180						
	Electronic Timing Modules – Off-Delay Delay of the control relay coil assembly. After interruption of the control signal, the control relay is deenergized at the end of the delay time.		100 ms	+/-1%	0.3...3 s	700-CF 110...240V AC coils	100-ETB3
					1...30 s		100-ETB30
					10...180 s	700-CF 24V AC coils	100-ETB180
					0.3...3 s		100-ETBKJ3
					1...30 s	100-ETBKJ30	
					10...180 s	100-ETBKJ180	

* On-Delay modules cannot be used with side-mounted auxiliary contacts on DC coil relays.

	Description	Connection Diagrams	For Use With	Cat. No.
	Mechanical Latch Following relay latching, the relay coil is immediately de-energized (off) by the N.C. auxiliary contact (65-66). Electrical or manual release 1 N.O. + 1 N.C. auxiliary contacts		700-CF with AC coils	100-FL11⊗

‡ All Cat. Nos. are factory stocked.

	Description	Connection Diagrams	For Use With	Cat. No.‡		
	Surge Suppressors For limitation of coil switching transients. Plug-in, coil mounted		700-CF with AC coils	RC Module AC Operating Mechanism 24...48V 50/60 Hz	100-FSC48	
				110...280V 50/60 Hz	100-FSC280	
				380...480V 50/60 Hz	100-FSC480	
			Varistor Module AC/DC Operating Mechanism	700-CF all	12...55V AC/ 12...77V DC	100-FSV55
					56...136V AC/ 78...180V DC	100-FSV136
					137...277V AC/ 181...350V DC	100-FSV277
					278...575V AC	100-FSV575
			Diode Module DC Operating Mechanism Dropout Time 70...95 ms	700-CF with Conventional DC coils	100-FSD250	

‡ All Cat. Nos. are factory stocked.


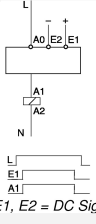
‡ For spring clamp terminals, insert CR after 100-. Example: Cat. No. 100-CRFSC48.

⊗ 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. 100-FL11⊗ becomes Cat. No. 100-FL11J.‡

[V]	24	48	100	110	120	230...240	240	277	380...400	400...415	440	480
50 Hz	K	Y	KP	D	—	VA	T	—	N	G	B	—
60 Hz	J	—	—	D	—	—	A	T	—	—	N	B

‡ For special voltages, consult your local Rockwell Automation sales office or Allen-Bradley distributor.



	Description (Relays)	Connection Diagrams	For Use With (Relays)	Cat. No.
	DC Interface (electronic) Interface between the DC control signal (PLC) and the AC operating mechanism of the control relay. Control (input) voltage 12V DC 24V DC 48V DC Requires no additional surge suppression on the relay coils	Input: 24V DC Output: 110...240V AC Input: 12V DC Output: 110...240V AC Input: 48V DC Output: 110...240V AC	 <i>E1, E2 = DC Signal</i>	700-CF with 110...240V AC coils 100-JE 100-JE12 100-JE48
Cat. No. 100-JE				

* All Cat. Nos. are factory stocked.

	Cat. No. 100-JE	Cat. No. 100-JE12	Cat. No. 100-JE48		
Electrical					
Input Voltage	24V DC	12V DC	48V DC		
Input Voltage Range	18...30V DC	6...12V DC	35...48V DC		
Output Voltage	110...240V AC	110...240V AC	110...240V AC		
Power Consumption	0.1...0.4 W	0.02...0.12 W	0.2...0.5 W		
Minimum Actuation	5V DC, 2 mA DC	5V DC, 2 mA DC	5V DC, 2 mA DC		
Mechanical					
Finger Protection	IP20	IP20	IP20		
Pickup Time	0...10 ms + pickup time of the contactor	0...10 ms + pickup time of the contactor	0...10 ms + pickup time of the contactor		
Dropout Time	0...10 ms + dropout time of the contactor	0...10 ms + dropout time of the contactor	0...10 ms + dropout time of the contactor		
Max. Cycles Per Second	2*	2*	2*		
Isolation/Breakdown Voltage	In: 50V, Out: 250V	In: 50V, Out: 250V	In: 50V, Out: 250V		
Rated Impulse Withstand Voltage	4 kV	4 kV	4 kV		
Environmental					
Ambient Temperature Range	-25...60 °C	-25...60 °C	-25...60 °C		
Storage Temperature Range	-50...+80 °C	-50...+80 °C	-50...+80 °C		
Operating Life	100+ million ops	100+ million ops	100+ million ops		
Construction					
Wire Size Range	Flexible wire	1 Wire	0.5...2.5 mm ²	0.5...2.5 mm ²	0.5...2.5 mm ²
		2 Wire	0.75...2.5 mm ²	0.75...2.5 mm ²	0.75...2.5 mm ²
	Solid wire	1 Wire	1.0...2.5 mm ²	1.0...2.5 mm ²	1.0...2.5 mm ²
		2 Wire	1.0...2.5 mm ²	1.0...2.5 mm ²	1.0...2.5 mm ²
	Solid and Stranded	18...14 AWG	18...14 AWG	18...14 AWG	
Tightening Torque	1...1.5 N•m/7...15 lb•in	1...1.5 N•m/7...15 lb•in	1...1.5 N•m/7...15 lb•in		
Type of Light	LED	LED	LED		

* To consider the maximum operations/hour of the relays.



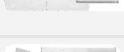

Assembly Components

	Description	For Use With	Pkg. Quantity*	Cat. No.
	Protective Covers Provides protection against unintended manual operation	700-CF all	1	100-SCCA
Cat. No. 100-SCCA				
	Protective Covers <ul style="list-style-type: none"> Provides protection against unintended manual operation 	100-FA, -FB, -FC, -FP, -FL	10	100-SCFA
Cat. No. 100-SCFA	<ul style="list-style-type: none"> For contactors and front-mounted auxiliary contacts, pneumatic timers, and latches 			

* All Cat. Nos. are factory stocked.


Marking Systems

Uniform labelling materials for contactors, motor startup equipment, relays, and circuit breakers.

	Description	Pkg. Quantity*	Cat. No.
	Label Sheet 105 self-adhesive paper labels each, 6 x 17 mm	10	100-FMS
	Marking Tag Sheet 160 perforated paper labels each, 6 x 17 mm, to be used with a transparent cover	10	100-FMP
	Transparent Cover To be used with marking tag sheets	100	100-FMC
	Marking Tag Adapters To be used with marking tag: System V4/V5	100	100-FMA1
	System 1492 W		100-FMA2


* Must be ordered in multiples of package quantities.

Coils

	AC Coil Code	AC Voltages			Cat. No. 700-CF	DC Coil Code	DC Voltages	Cat. No. 700-CF
		50Hz	60Hz	50/60Hz				
	Q	—	12V	—	TA006	ZR	9V	TA766
	R	12V	—	—	TA404	ZQ	12V	TA708
	J	—	24V	—	TA013	DJ	24V Diode	TA714M
	K	24V	—	—	TA407	ZJ	24V	TA714
	KJ	—	—	24V	TA855	ZW	36V	TA719
	V	32V	36V	—	TA481	ZY	48V	TA724
	W	36V	—	—	TA410	ZZ	60V	TA774
	X	42V	48V	—	TA482	ZB	64V	TA727
	Y	48V	—	—	TA414	ZG	72V	TA728
	KY	—	—	48V	TA860	ZE	80V	TA729
	KP	100V	100 - 110V	100V	TA861	ZD	110V	TA733
	D	110V	120V	—	TA473	ZP	115V	TA734
	KD	—	—	110V	TA856	ZS	125V	TA737
	P	120V	—	—	TA425	ZA	220V	TA747
	S	127V	—	—	TA428	ZF	230V	TA749
	KG	200V	200 - 220V	200V	TA862	ZT	250V	TA751
	H	—	208V	—	TA049	—	—	—
	L	200 - 220V	208 - 240V	—	TA296	—	—	—
	KL	—	—	200 - 230V	TA864	—	—	—
	A	220V	240V	—	TA474	—	—	—
	F	220 - 230V	260V	—	TA441	—	—	—
	KF	—	—	230V	TA851	—	—	—
	VA	230 - 240V	—	—	TA440	—	—	—
	T	240V	277V	—	TA480	—	—	—
	KA	—	—	240V	TA858	—	—	—
	I	—	347V	—	TA065	—	—	—
	E	—	380V	—	TA067	—	—	—
	N	380 - 400V	440V	—	TA071	—	—	—
	KN	—	—	400V	TA863	—	—	—
	G	400-415V	—	—	TA457	—	—	—
	B	440V	480V	—	TA475	—	—	—
	KB	—	—	440V	TA859	—	—	—
M	500V	—	—	TA479	—	—	—	
C	550V	600V	—	TA476	—	—	—	





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	
	690V	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	I_{th}	20 A	10 A	10 A	20 A	10 A	
		230V	8 kW					
		400V	14 kW					
		690V	24 kW					
	60 °C	I_{th}	20 A	6 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	Front aux.	Side aux.
	Main	Open	Open	Open*
Mechanically Linked Contacts‡	Front aux.	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./Pneumatic Timer Contact (Front-mounted)		
Mechanical Life	[MI]	15	5		
Electrical Life	AC-15 (240V, 3 A) [MI]	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	[mm ²]	1.5...6	0.5...2.5
		2 Conductor	[mm ²]	1.5...6	0.75...2.5
Max. Wire Size per UL/CSA	[AWG]	16...10		18...14	
Tightening Torque	[lb·in]	13.3...17.7		8.9...13.3	
Tightening Torque	[N·m]	1.5...2.0		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	15/10 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

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 (conventional)*	Pickup	[x U _s]	0.8...1.1
	Dropout	[x U _s]	0.1...0.6
DC (electronic - EQ, EW)	Pickup	[x U _s]	0.7...1.25
	Dropout	[x U _s]	0.3...0.4
DC (electronic - EY)	Pickup	[x U _s]	0.8...1.25
	Dropout	[x U _s]	0.3...0.4
DC (electronic - ED)	Pickup	[x U _s]	0.7...1.12 ‡
	Dropout	[x U _s]	0.3...0.4
DC (electronic - EA)	Pickup	[x U _s]	0.8...1.1
	Dropout	[x U _s]	0.3...0.4
Coil Consumption			
AC 50/60 Hz	Inrush	[VA]	75
	Sealed	[VA/W]	9.5/2.7
DC (conventional)	Inrush	[W]	7.7
	Sealed	[W]	6.3
DC (electronic - EQ, EJ)	Inrush (avg./ peak)	[W]	10/17
	Sealed	[W]	1.7
DC (electronic - EY)	Inrush (avg./ peak)	[W]	10/17
	Sealed	[W]	1.9
DC (electronic - ED)	Inrush (avg./ peak)	[W]	12/19
	Sealed	[W]	2.1
DC (electronic - EA)	Inrush (avg./ peak)	[W]	14/22
	Sealed	[W]	3.0
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
With integrated diode	Opening Delay	[ms]	14...20
With external diode	Opening Delay	[ms]	70...125
DC (electronic- EQ, EJ)	Closing Delay	[ms]	25...50
	Opening Delay	[ms]	27...45
Min OFF time		[ms]	50
Max. ripple			± 15%
DC (electronic- EY, ED, EA)	Closing Delay	[ms]	25...50
	Opening Delay	[ms]	23...33
Min OFF time		[ms]	50
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.

‡ At 110V DC, coil code ED has an operating voltage range of 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 20 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	$\cos \psi$	I/I_e	U/U_e	$\cos \psi$	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	$6 \times P\Delta$	1	1	$6 \times P\Delta$	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

$P_{U_e I_e}$ 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 .

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

Contact Rating Table from EN 60947-5-1

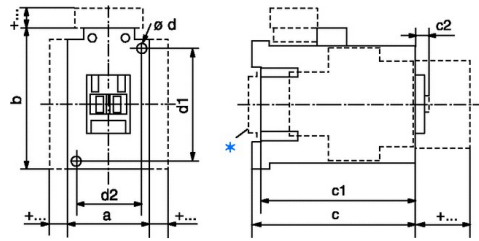
Examples of Contact Rating Designation Based on Utilization Categories

NEMA Designation *	IEC Utilization Category	Conventional Thermal Current I_{the} (A)	Rated Operational Current I_e (A) at Rated Operational Voltage U_e							VA Rating	
			120V	240V	380V	480V	500V	600V	Make	Break	
AC			120V	240V	380V	480V	500V	600V	Make	Break	
A150	AC-15	10	6	—	—	—	—	—	7200	720	
A300	AC-15	10	6	3	—	—	—	—	7200	720	
A600	AC-15	10	6	3	1.9	1.5	1.4	1.2	7200	720	
B150	AC-15	5	3	—	—	—	—	—	3600	360	
B300	AC-15	5	3	1.5	—	—	—	—	3600	360	
B600	AC-15	5	3	1.5	0.95	0.75	0.72	0.6	3600	360	
C150	AC-15	2.5	1.5	—	—	—	—	—	1800	180	
C300	AC-15	2.5	1.5	0.75	—	—	—	—	1800	180	
C600	AC-15	2.5	1.5	0.75	0.47	0.375	0.35	0.3	1800	180	
D150	AC-14	1.0	0.6	—	—	—	—	—	432	72	
D300	AC-14	1.0	0.6	0.3	—	—	—	—	432	72	
E150	AC-14	0.5	0.3	—	—	—	—	—	216	36	
DC			125V	250V	440V	500V	600V	—	—	—	
N150	DC-13	10	2.2	—	—	—	—	—	275	275	
N300	DC-13	10	2.2	1.1	—	—	—	—	275	275	
N600	DC-13	10	2.2	1.1	0.63	0.55	0.4	—	275	275	
P150	DC-13	5	1.1	—	—	—	—	—	138	138	
P300	DC-13	5	1.1	0.55	—	—	—	—	138	138	
P600	DC-13	5	1.1	0.55	0.31	0.27	0.2	—	138	138	
Q150	DC-13	2.5	0.55	—	—	—	—	—	69	69	
Q300	DC-13	2.5	0.55	0.27	—	—	—	—	69	69	
Q600	DC-13	2.5	0.55	0.27	0.15	0.13	0.1	—	69	69	
R150	DC-13	1.0	0.22	—	—	—	—	—	28	28	
R300	DC-13	1.0	0.22	0.1	—	—	—	—	28	28	

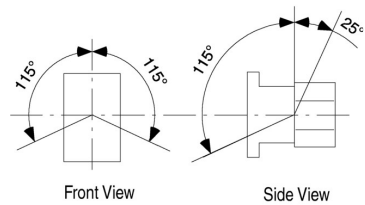
* This letter stands for the conventional thermal current and identifies AC or DC: e.g., B = 5 A AC. The number that follows is the rated insulation voltage.

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

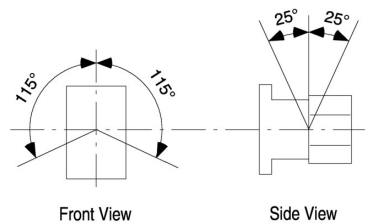
Mounting Position



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 48...72V, 110...125V or 220...250V 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 with Conventional Coil

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)