



**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							Contacts		Standard Contacts Cat. No.*	Gold Plated Bifurcated Contacts Cat. No.*	Master Contacts Cat. No.*	
$I_{th}$ [A]		$I_e$ [A]							Connection Diagrams					
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	110	120	127	200	200	208	220	230	240	277	347	380	380	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	—	—	—	—	—	KN	—	KB	—	—	—

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

AC-12		AC-15							Contacts		Standard Contacts Cat. No.†	Gold Plated Bifurcated Contacts Cat. No.*	Master Contacts Cat. No.*	
$I_{th}$ [A]		$I_e$ [A]							Connection Diagrams					
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...	60	64	72	80	110	110...	115	125	125	220	220...	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  
**IEC Industrial Control Relays**  
 Product Selection

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

⊗ 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	110	120	127	200	220	208	220	230	230	240	277	347	380	380	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 $\otimes$ 220	700-CF $\otimes$ 310	700-CF $\otimes$ 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.
	<b>Auxiliary Contact Blocks for Front Mounting†</b> 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	<b>100-FA02</b>	<b>100-FAB02</b>
		1	1			<b>100-FA11</b>	<b>100-FAB11</b>
		2	0			<b>100-FA20</b>	<b>100-FAB20</b>
		1L	1L			<b>100-FAL11</b>	—
		0	4			<b>100-FA04</b>	<b>100-FAB04</b>
		1	3			<b>100-FA13</b>	<b>100-FAB13</b>
		2	2			<b>100-FA22</b>	<b>100-FAB22</b>
		3	1			<b>100-FA31</b>	<b>100-FAB31</b>
		4	0			<b>100-FA40</b>	<b>100-FAB40</b>
		1+1 L	1+1 L			<b>100-FAL22</b>	—

\* 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.
	<b>Auxiliary Contact Blocks for Side Mounting without Sequence Terminal Designations‡</b> 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	<b>100-SA01</b>
		1	0			<b>100-SA10</b>
		0	2			<b>100-SA02</b>
		1	1			<b>100-SA11</b>
		2	0			<b>100-SA20</b>
		1L	1L			<b>100-SAL11</b>

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

700-CF (AC and DC electronic coils), vertical mounting, 60 °C >

Cat. No. 700...	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	4*	6	5	8
CF220	4	4§	4	2	8	5	8
CF040	2	2	4	0	6	2	6





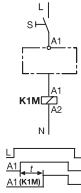

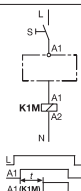
700-CF (DC conventional coils), vertical mounting, 60 °C >

Cat. No. 700...	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	4*	6	5	8
CF310	2	2	4	4*	6	5	8
CF220	2	2	4	2	6	4	8


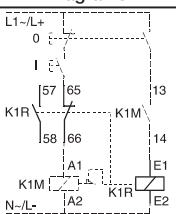
§ With no front auxiliary contacts installed. Otherwise 3 N.C. Maximum  
 \* With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum  
 > For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.


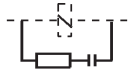
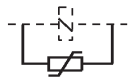
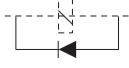
\* With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum  
 > For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.

**Control Modules**

	Description	Connection Diagrams	Reset Time	Repeat Accuracy	Delay	For Use With	Cat. No.
	<b>Pneumatic Timing Modules* ON-Delay</b> 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	+/-10%	0.3...30 s	700-CF all*	<b>100-FPTA30</b>
					1.8...180 s		<b>100-FPTA180</b>
	<b>Pneumatic Timing Modules OFF-Delay</b> Pneumatic timing element contacts switch after the delay time. The contacts on the main control relay continue to operate without delay.		47...85 ms for DC coils		0.3...30 s		<b>100-FPTB30</b>
					1.8...180 s		<b>100-FPTB180</b>
	<b>Electronic Timing Modules — On-Delay</b> 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 coils	<b>100-ETA3</b>
					1...30 s		<b>100-ETA30</b>
					10...180 s		<b>100-ETA180</b>
					0.1...3 s	700-CF 24...48V DC coils	<b>100-ETAZJ3</b>
					1...30 s		<b>100-ETAZJ30</b>
					10...180 s		<b>100-ETAZJ180</b>
 <p><b>Cat. No. 100-ETB30</b></p>	<b>Electronic Timing Modules — Off-Delay</b> 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	<b>100-ETB3</b>
					1...30 s		<b>100-ETB30</b>
					10...180 s		<b>100-ETB180</b>
					0.3...3 s	700-CF 24V AC coils	<b>100-ETBKJ3</b>
					1...30 s		<b>100-ETBKJ30</b>
					10...180 s		<b>100-ETBKJ180</b>

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

	Description	Connection Diagrams	For Use With	Cat. No.
 <p><b>Cat. No. 100-FL⊗</b></p>	<b>Mechanical Latch</b> 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	<b>100-FL11⊗</b>

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

\* 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.‡**


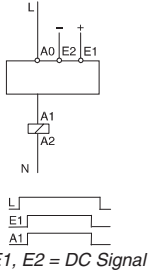
[V]	24	48	100	110	120	230...240	240	277	380...400	400...415	440	480
50 Hz	K	Y	KP	D	—	VA	T	—	N	G	B	—
60 Hz	J	—	—	—	D	—	A	T	—	—	N	B

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



# IEC Industrial Control Relays



## Accessories

	Description (Relays)	Connection Diagrams	For Use With (Relays)	Cat. No.	
 <b>Cat. No. 100-JE</b>	<b>DC Interface</b> (electronic) Interface between the DC control signal (PLC) and the AC operating mechanism of the control relay. Control (input) voltage 12V DC 18...30V DC (24V nominal) 48V DC Requires no additional surge suppression on the relay coils	Input: 18...30V DC Output: 110...240V AC  Input: 12V DC Output: 110...240V AC  Input: 48V DC Output: 110...240V AC	 E1, E2 = DC Signal	<b>100-JE</b>	
				700-CF with 110...240V AC coils	<b>100-JE12</b>
					<b>100-JE48</b>

		Cat. No. 100-JE	Cat. No. 100-JE12	Cat. No. 100-JE48	
<b>Electrical</b>					
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	
<b>Mechanical</b>					
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	
<b>Environmental</b>					
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	
<b>Construction</b>					
Wire Size Range	Flexible wire	1 Wire	0.5...2.5 mm <sup>2</sup>	0.5...2.5 mm <sup>2</sup>	0.5...2.5 mm <sup>2</sup>
		2 Wire	0.75...2.5 mm <sup>2</sup>	0.75...2.5 mm <sup>2</sup>	0.75...2.5 mm <sup>2</sup>
	Solid wire	1 Wire	1.0...2.5 mm <sup>2</sup>	1.0...2.5 mm <sup>2</sup>	1.0...2.5 mm <sup>2</sup>
		2 Wire	1.0...2.5 mm <sup>2</sup>	1.0...2.5 mm <sup>2</sup>	1.0...2.5 mm <sup>2</sup>
	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.
 <b>Cat. No. 100-SCCA</b>	<b>Protective Covers</b> Provides protection against unintended manual operation	700-CF all	1	<b>100-SCCA</b>
 <b>Cat. No. 100-SCFA</b>	<b>Protective Covers</b> Provides protection against unintended manual operation For front mounted auxiliary contacts, pneumatic timers and latches	100-FA, -FB, -FC, -FP, -FL;	10	<b>100-SCFA</b>


**Marking Systems**

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

	Description	Pkg. Quantity*	Cat. No.
	<b>Label Sheet</b> 105 self-adhesive paper labels each, 6 x 17 mm	10	<b>100-FMS</b>
	<b>Marking Tag Sheet</b> 160 perforated paper labels each, 6 x 17 mm, to be used with a transparent cover	10	<b>100-FMP</b>
	<b>Transparent Cover</b> To be used with marking tag sheets	100	<b>100-FMC</b>
	<b>Marking Tag Adapters</b> 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	—	<b>TA006</b>	ZR	9V	<b>TA766</b>
	R	12V	—	—	<b>TA404</b>	ZQ	12V	<b>TA708</b>
	J	—	24V	—	<b>TA013</b>	DJ	24V Diode	<b>TA714M</b>
	K	24V	—	—	<b>TA407</b>	ZJ	24V	<b>TA714</b>
	KJ	—	—	24V	<b>TA855</b>	ZW	36V	<b>TA719</b>
	V	32V	36V	—	<b>TA481</b>	ZY	48V	<b>TA724</b>
	W	36V	—	—	<b>TA410</b>	ZZ	60V	<b>TA774</b>
	X	42V	48V	—	<b>TA482</b>	ZB	64V	<b>TA727</b>
	Y	48V	—	—	<b>TA414</b>	ZG	72V	<b>TA728</b>
	KY	—	—	48V	<b>TA860</b>	ZE	80V	<b>TA729</b>
	KP	100V	100 - 110V	100V	<b>TA861</b>	ZD	110V	<b>TA733</b>
	D	110V	120V	—	<b>TA473</b>	ZP	115V	<b>TA734</b>
	KD	—	—	110V	<b>TA856</b>	ZS	125V	<b>TA737</b>
	P	120V	—	—	<b>TA425</b>	ZA	220V	<b>TA747</b>
	S	127V	—	—	<b>TA428</b>	ZF	230V	<b>TA749</b>
	KG	200V	200 - 220V	200V	<b>TA862</b>	ZT	250V	<b>TA751</b>
	H	—	208V	—	<b>TA049</b>	—	—	—
	L	200 - 220V	208 - 240V	—	<b>TA296</b>	—	—	—
	KL	—	—	200 - 230V	<b>TA864</b>	—	—	—
	A	220V	240V	—	<b>TA474</b>	—	—	—
	F	220 - 230V	260V	—	<b>TA441</b>	—	—	—
	KF	—	—	230V	<b>TA851</b>	—	—	—
	VA	230 - 240V	—	—	<b>TA440</b>	—	—	—
	T	240V	277V	—	<b>TA480</b>	—	—	—
	KA	—	—	240V	<b>TA858</b>	—	—	—
	I	—	347V	—	<b>TA065</b>	—	—	—
	E	—	380V	—	<b>TA067</b>	—	—	—
	N	380 - 400V	440V	—	<b>TA071</b>	—	—	—
	KN	—	—	400V	<b>TA863</b>	—	—	—
	G	400-415V	—	—	<b>TA457</b>	—	—	—
	B	440V	480V	—	<b>TA475</b>	—	—	—
	KB	—	—	440V	<b>TA859</b>	—	—	—
	M	500V	—	—	<b>TA479</b>	—	—	—
	C	550V	600V	—	<b>TA476</b>	—	—	—

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	<b>I<sub>th</sub></b>	20 A	10 A	10 A	20 A	10 A	10 A
			230V	8 kW					
			400V	14 kW					
			690V	24 kW					
		60 °C	<b>I<sub>th</sub></b>	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.
Mechanically Linked Contacts*	Main	Open	Open	Open*
	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./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	[mm <sup>2</sup> ]	1.5...6	0.5...2.5
	§	2 Conductor	[mm <sup>2</sup> ]	1.5...6	0.75...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
<b>24/48V</b>	25/20 A	25 A	25 A
<b>125V</b>	6 A	25 A	25 A
<b>220V</b>	1.5 A	8 A	25 A
<b>440V</b>	0.4 A	1 A	3 A





**Control Circuit**

			Cat. No. 700-CF
<b>Operating Voltage</b>			
AC 50/60 Hz	Pickup	[x U <sub>s</sub> ]	0.85...1.1
	Dropout	[x U <sub>s</sub> ]	0.3...0.6
DC*	Pickup	[x U <sub>s</sub> ]	0.8...1.1
	Dropout	[x U <sub>s</sub> ]	0.1...0.6
<b>Coil Consumption</b>			
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
<b>Operating Times</b>			
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%
<b>Latch Attachment Release, 100-FL</b>			
Coil Consumption	AC	[VA/W]	45/40
	DC	[W]	25
<b>Contact Signal Duration</b>		[min./max]	0.03...15 s
<b>Timing Attachment</b>			
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<sub>s</sub>.  
 For 24V DC, code ZJ, DJ, or EJ use operating voltage 0.7...1.25 x U<sub>s</sub>.  
 For 110V DC, code ED use operating voltage 0.7...1.25 x U<sub>s</sub>.

**General**

		Cat. No. 700-CF
<b>Rated Insulation Voltage U<sub>i</sub></b>		
IEC		690V
UL; CSA		600V
<b>Rated Impulse Strength U<sub>imp</sub></b>		6 kV
High Test Voltage 1 minute (per IEC 60947-4)		2500V
<b>Rated Voltage U<sub>e</sub></b>		
AC		115, 230, 400, 500, 690V
DC		24, 48, 110, 220, 440V
<b>Short-Circuit Protection gG Fuse 10 A</b>		
<b>Rated Frequency</b>		50/60 Hz, DC
<b>Ambient Temperature</b>		
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)
<b>Corrosion Resistance</b>		humid-alternating climate, cyclic, per IEC 60068-2-30 and DIN 50 016, 56 cycles
<b>Altitude</b>		2000 m above mean sea level, per IEC60 947-4
<b>Type of Protection</b>		
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 <sub>e</sub>	U/U <sub>e</sub>	cos ψ	I/I <sub>e</sub>	U/U <sub>e</sub>	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 <sub>0.95</sub>	—	—	T <sub>0.95</sub>	—	—	—
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<sub>e</sub> Rated operational current, I Current to be made or broken

U<sub>e</sub> Rated operational voltage, U Voltage before make

PU<sub>e</sub> Steady-state power consumption (W)

T<sub>0.95</sub> 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<sub>e</sub>=1.1 with the loads set at U<sub>e</sub>.

\* 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.

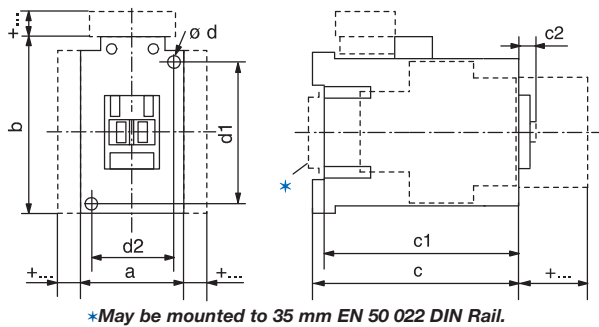
► The ON time shall be at least equal to T<sub>0.95</sub>.

⌘ 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.

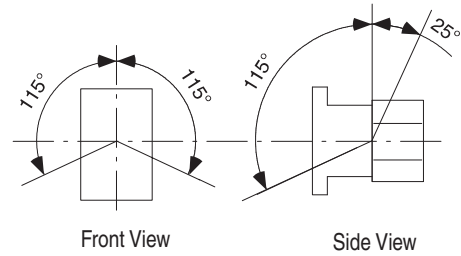
Bulletin 700-CF, 700-CFB, 700-CFM  
**IEC Industrial Control Relays**  
 Approximate Dimensions

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

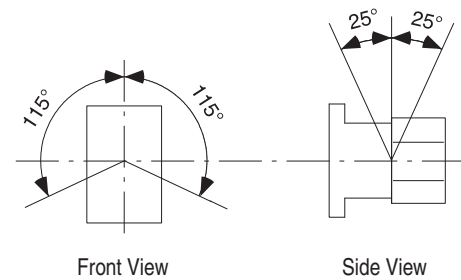
**Mounting Position**



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)

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**Accessories**

Relay with	AC Control Relay		DC Control Relay		
	mm	(inches)	mm	(inches)	
Auxiliary Contact for Front Mounting	c/c1 + 39	(c/c1 + 1 - 37/64)	c/c1 + 39	c/c1 + 1 - 37/64)	
Auxiliary Contact for Side Mounting	a + 9	(a + 23/64)	a + 9	(a + 23/64)	
Pneumatic Timing Module	—	—	—	—	
Solid-state Timing Module	on coil terminal side	b + 24	(b + 15/16)	b + 24	(b + 15/16)
Mechanical Latching	—	—	—	—	
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)