



Description

Bulletin 700S-CF Safety Control Relays provide mechanically or mirror contact performance, which are required in feedback circuits for safety applications. Bifurcated contacts are ideal for low energy feedback safety circuits where high contact reliability is required.

Features

- IEC industrial safety relay
- Mechanically linked contacts as per IEC 60947-5-1
- Third party certification SUVA
- Red cover and mechanically linked contact symbol on front face
- Gold plated, bifurcated version for low level switching applications
- Permanently fixed front mounted auxiliary contact block

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Standards Compliance

EN/IEC 60947-1, -5-1
 UL 508
 CSA C22.2 No. 14

Certifications

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

Type CF and CFB Safety Control Relays — 8-Pole AC Coil Voltage

AC-12			AC-15							Contacts		Standard Contacts (Main) Gold-Plated Bifurcated (Front) Cat. No.	Gold-Plated Bifurcated, All Contacts Cat. No.*		
I_e [A]		I_e [A]	I_e [A]							Connection Diagrams					
40 °C	60 °C		24/48V	120V	240V	400V	500V	600V	690V	Main Contacts	Auxiliary Contacts			N.O.	N.C.
Main Contacts	20	20	10	10	10	6	2.5	1	1			4	4	700S-CF440BC	700S-CFB440BC
												5	3	700S-CF530BC	700S-CFB530BC
Adder Deck Contacts	10	6	6	6	5	3	1.6	1	1			6	2	700S-CF620BC	700S-CFB620BC

* Ratings for Bulletin 700CFB and CFM are on page 9-161

⊗ 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. 700S-CF440BC** becomes **Cat. No. 700S-CF440DC** 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
50 Hz	R	K	V	W	X	Y	KP	—	D	P	S	KG	L	—	—	F
60 Hz	Q	J	—	V	—	X	—	KP	—	D	—	—	KG	H	L	—
50/60 Hz	—	KJ	—	—	—	KY	KP	—	KD	—	—	KG	KL	—	—	KL

[V]	230	230-240	240	277	347	380	380-400	400	400-415	440	480	500	550	600
50 Hz	—	VA	T	—	—	—	N	—	G	B	—	M	C	—
60 Hz	—	—	A	T	I	E	—	—	—	N	B	—	—	C
50/60 Hz	KF	—	KA	—	—	—	—	—	KN	—	KB	—	—	—

Type CF and CFB Safety Control Relays — 8-Pole AC Coil Voltage (Ratings for 700S-CF Only)

AC-12			AC-15							Connection Diagrams		Contacts		Standard Contacts Cat. No.*	Gold Plated Bifurcated, All Contacts Cat. No.*		
I_e [A]			I_e [A]							Main Contacts		Auxiliary Contacts				No. of N.O. Contacts	No. of N.C. Contacts
40 °C	60 °C		24/48V	120V	240V	400V	500V	600V	690V	No. of N.O. Contacts		No. of N.C. Contacts					
Main Contacts	20	20	10	10	10	6	2.5	1	1			4	4	700S-CF440 ⊗C	700S-CFB440 ⊗C		
												5	3	700S-CF530 ⊗C	700S-CFB530 ⊗C		
Adder Deck Contacts	10	6	6	6	5	3	1.6	1	1			6	2	700S-CF620 ⊗C	700S-CFB620 ⊗C		

* Ratings for Bulletin 700-CFB and 700-CFM are on page 9-161

⊗ DC Coil Voltage Code

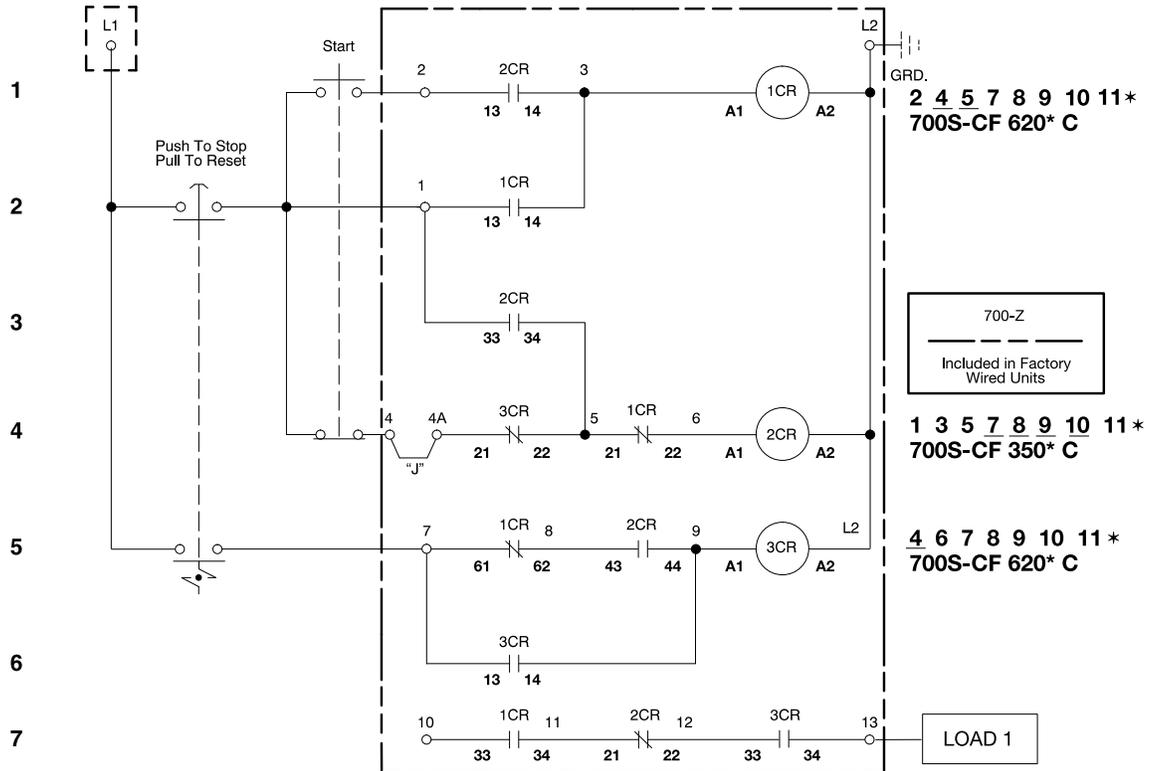
The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: **700S-CF440**⊗C becomes **Cat. No. 700S-CF440ZJC** for 24V DC.

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

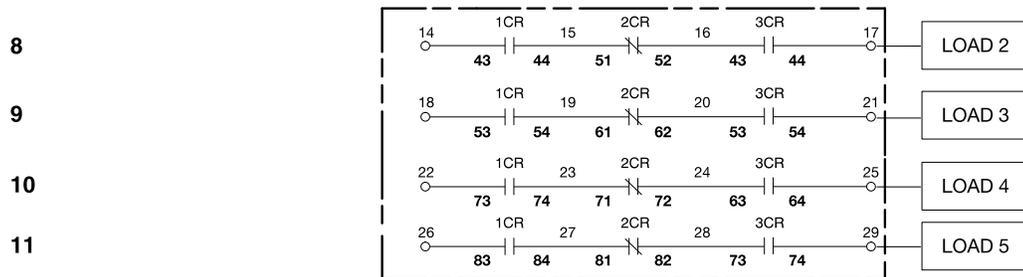
For general Bulletin 700S-CF specifications, refer to page 9-155.

Basic Circuit

(1) Output Circuit (3 Relays, 9 Terminal Blocks)



(5) Output Circuit (3 Relays, 17 Terminal Blocks)



* Numbers shown are the line numbers where the contacts for this relay appear.
 Contact your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Safety Relay Circuit With 5 Safety Outputs

- Use for E-stop control. E-stop will work properly if any one fault occurs (a fault could be one welded contact or one undesired open connection such as a loose wire).
- High output switching capability and long contact life.
- Circuit complies with EN 954 categories 1, 2, 3, 4.
- Helps prevent restart of the 5 safety outputs if there is a single fault anywhere in the system.
- Use (3) 700S-CF relays and this diagram to construct the circuit

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	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
		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	3 A
	110V	1.2 A	1.2 A	0.6 A	1.2 A	0.6 A	1.2 A
	220V	0.6 A	0.6 A	0.3 A	0.6 A	0.3 A	0.6 A
	440V	0.3 A	0.15 A	0.15 A	0.3 A	0.15 A	0.15 A

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

	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	—

* 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. 700S-CF	Aux. Contact (Front-mounted)
Mechanical Life	[Mil]	15	15
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 IEC 947-1		2 x A4	2 x A4
	Solid/	1 Conductor	[mm ²]
	Stranded‡	2 Conductor	[mm ²]
Max. Wire Size per UL/CSA		[AWG]	16...10
Tightening Torque		[lb-in]	13.3...22
Tightening Torque		[N-m]	1.5...2.5

‡ For 16 or more strands, end ferrule is required

DC Switching Ratings for 700S-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

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	Inrush/Seal	[W]	6.5
Operating Times			
AC 50/60 Hz	Pickup Time	[ms]	15...30
	Dropout Time	[ms]	10...60
DC	Pickup Time	[ms]	40...70
	Dropout Time	[ms]	7...15
Latch Attachment Release, 100-FL			
Coil Consumption	AC	[VA/W]	45 VA/40W
	DC	[W]	25 W
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 or DJ, use operating voltage 0.7...1.25 x U_s.

Utilization Category Table from EN 947-5-1

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	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	6050	—	0.05►

I_e Rated operational current

U_e Rated operational voltage I Current to be made or broken

PU_eI_e Steady-state power consumption (W)

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

* 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.

General

		Cat. No. 700-CF
Rated Insulation Voltage U_i		
IEC		690 V
UL; CSA		600 V
Rated Impulse Strength U_{imp}		8 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)
Conditioned 15% current reduction after AC-1 at > 60 °C		-25...+70 °C (-13...158 °F)
Corrosion Resistance		humid-alternating climate, cyclic, per IEC 68-2-30 and DIN 50 016, 56 cycles
Altitude		2000 m above mean sea level, per IEC 947-4
Type of Protection		
IP2X (IEC 60529 and DIN 40050)		in connected state
Shock Resistance		IEC 68-2: Half sinusoidal shock 11 ms, 30 G (in 3 directions)
Vibration Resistance		IEC 68-2: Static >2 G, in normal position no malfunction <5 G

Contact Rating Table from EN 60947-5-1

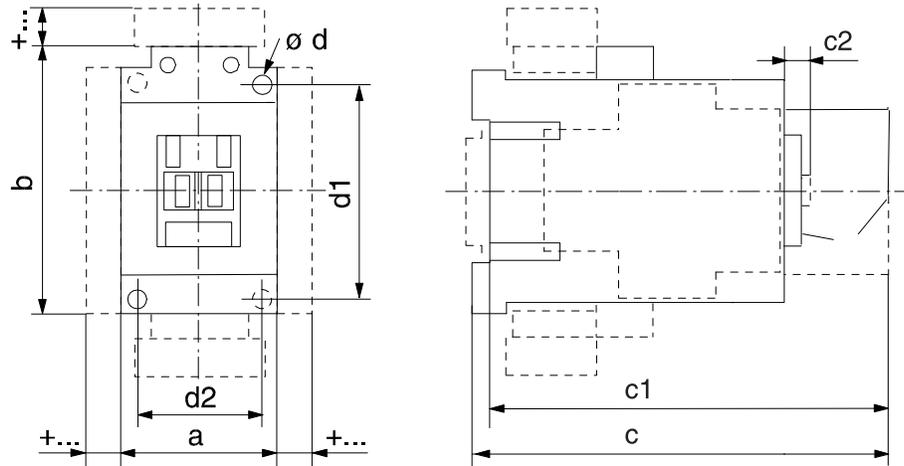
Examples of Contact Rating Designation Based on Utilization Categories

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.

Bulletin 700S-CF
Industrial Relays
 Approximate Dimensions

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



AC and DC EJ Safety Control Relays

Cat. No.	a	b	c	c1	c2	Ød	d1	d2
700S-CF	45	81	119.5	114.5	6	2 - 4.5	60	35
	(1-25/32)	(3-3/16)	(4-3/4)	(4-43/64)	(1/4)	(2 - 3/16)	(2-23/64)	(1-25/64)

DC Safety Control Relays

Cat. No.	a	b	c	c1	c2	Ød	d1	d2
700S-CF	45	81	145.5	140.5	6	2 - 4.5	60	35
	(1-25/32)	(3-3/16)	(5-49/64)	(5-37/64)	(1/4)	(2 - 3/16)	(2-23/64)	(1-25/64)

Accessories

Safety Control Relays with	mm	[in.]
Auxiliary contact block for side mounting 1- or 2-pole	a + 9	(a + 23/64)
Electronic Timing Module on coil terminal side	b + 24	(b + 15/16)
Interface Module on coil terminal side	b + 9	(b + 23/64)
Surge Suppressor on coil terminal side	b + 3	(b + 1/8)
Labeling with label sheet	+ 0	(+ 0)
Marking tag sheet with clear cover	+ 0	(+ 0)
Marking tag adapter for System Bul. 1492W	+ 5.5	(+ 7/32)

9 Mounting Position

