

AMSC N/A

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FED. SUP CLASS 5925		30 NOV 1987	
REF LINE A .120 MIN .250 LOCKWASHER MS35333-141 .172 MIN TYP CLEARANCE FROM CENTER OF SCREW TO CASE WHEN USING OPTIONAL OUTLINE BREAKER SHOWN IN TRIPPED POSITION BLACK WHITE INDICATOR NUT MS25082-C18 BLACK FINISH CENTERLINE OF MOUNTING KEY .593 MAX .375 ±.010 .781 MAX .078 ±.005 .031 ±.005 .330 ±.015 DIA .100 ±.015 .395 ±.005 DIA .045 ±.010 ±.005 45° ±2° .500 .250 OPTIONAL TRIANGULAR OUTLINE AS SHOWN BY DOTTED LINES SCREW MS51957-41 LOCKWASHER MS35338-137 1.030 MAX 1.218 1.343 MAX REF LINE A OPTIONAL CONTOUR LINE TERMINAL - IDENTIFY WITH WORD "LINE" AMPERAGE RATING IN WHITE ON BLACK, MINIMUM HEIGHT .125 BREAKER SHOWN IN CLOSED POSITION .4375-32UN-2A THD TO WITHIN .062 MAX OF REF LINE A AMPERAGE RATING WHITE ON BLACK, MINIMUM HEIGHT .125 (ROTATED 90° FROM STANDARD) STANDARD VERSION EXTRA LENGTH PUSHBUTTON VERSION		APPROVED 1 MAY 1968 REVISED 14 OCTOBER 1976 31 JANUARY 1977 1 SEPT 77 29 MAY 1981 7 DEC 83	
(N) DENOTES CHANGES			
P.A. NAVY - AS Other Cust USAF - 85 ARMY - ER	INTERNATIONAL INTEREST *	TITLE CIRCUIT BREAKER-AIRCRAFT, TRIP-FREE, PUSH PULL, 1/2 THRU 20 AMPS, TYPE I -55 THRU +121°C	
PROCUREMENT SPECIFICATION MIL-C-5809		SUPERSEDES:	
MILITARY STANDARD MS3320		SHEET 1 OF 6	

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TABLE I (N)

ELECTRICAL AND MECHANICAL CHARACTERISTICS

DASH NO.	NOMINAL AMPERAGE RATING (A)	VOLTAGE DROP MAX (V)	WEIGHT MAX (LBS)	OPERATING FORCE MAX (LBS)		ENDURANCE CYCLES				MECH NO LOAD
						RESISTIVE		INDUCTIVE		
				PULLOUT	RESET	AC	DC	AC	DC	
1/2	0.5 (1/2)	1.90	.055	.75 to 5	1.2 to 8	1/5,000	2/5,000	1/2,500	2/2,500	10,000
3/4	0.75 (3/4)	1.20								
1	1	1.10								
1-1/2	1.5 (1½)	0.80								
2	2	0.75								
2-1/2	2.5 (2½)	0.70								
3	3	0.55								
4	4	0.45								
5	5	0.35								
7-1/2	7.5 (7½)	0.30								
10	10	0.28								
15	15	0.25								
20	20	0.25								

- 1/ 400 HZ 115/200 VOLT SYSTEM, TESTED AT 120 ± 5 VOLTS 380-420 HZ.
2/ 28 VOLTS DC SYSTEM, TESTED AT 30 ± 2 VOLTS.

TABLE II (N)

3/ DETAIL CALIBRATION REQUIREMENTS									
NOMINAL AMPERAGE RATING (A)	OVERLOAD TRIP TIME IN SECS AT PERCENT RATED CURRENT -55°C TO 121°C			AMBIENT EFFECT ON CALIBRATION AT PERCENT RATED CURRENT					
				+25°C		+121°C		-55°C	
	200%	500%	1000%	115%	138%	100%	138%	115%	160%
0.5 (1/2)	1.5 to 40	0.15 to 3.0	.035 to 0.8	MUST HOLD - 1 HOUR MIN	MUST TRIP - 1 HOUR MAX	MUST HOLD - 1 HOUR MIN	MUST TRIP - 1 HOUR MAX	MUST HOLD - 1 HOUR MIN	MUST TRIP - 1 HOUR MAX
0.75 (3/4)									
1									
1.5 (1 1/2)									
2									
2.5 (2 1/2)									
3									
4									
5									
7.5 (7 1/2)									
10									
15									
20									

- AMBIENT TEMPERATURE TOLERANCE ±2°C
3/ SEE TABLE VII FOR ADDITIONAL CALIBRATION PERFORMANCE REQUIREMENTS.

APPROVED 1 MAY 1968 REVISED FOR CHANGES SEE SHEETS 1 THRU 6

P.A. NAVY -- AS Other Cust USAF - 85 ARMY - ER	INTER- NATIONAL INTEREST *	TITLE CIRCUIT BREAKER-AIRCRAFT, TRIP-FREE, PUSH-PULL, 1/2 THRU 20 AMPS, TYPE I -55°C THRU +121°C	MILITARY STANDARD			
			MS 3320			
PROCUREMENT SPECIFICATION MIL-C-5809		SUPERSEDES:	SHEET 2 OF 6			

DD FORM 1 MAR 72 672-1 (Coordinated)

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PLATE NO. 22006

TABLE III

(N)

INTERRUPTING CURRENT (AMPERES) REQUIREMENTS 4/						
NOMINAL AMPERAGE RATING (A)	TEST DESIGNATION PER MIL-C5809					
	A	B	C	D	E	F
0.5 (1/2)	2800	2800	6000	6000	6000	(a) 3,000 (b) 1,000
0.75 (3/4)	3500	3500				
1.5 (1/2)	2800	2800				
2						
2.5 (2 1/2)			6000	6000	(a) 1,500 (b) 750	
3						
4						
5						
7.5 (7 1/2)	2500	2500	6000	6000	6000	
10						
15						
20	2000	2000				

4/ SEE TABLE V FOR ADDITIONAL INTERRUPTING REQUIREMENTS.

TABLE IV

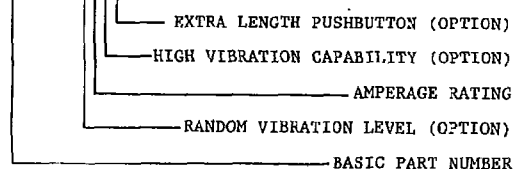
(N)

ENVIRONMENTAL PERFORMANCE	
MAX OPERATING ALTITUDE - OPERATING AMBIENT TEMP RANGE	70,000 FEET -55°C TO +121°C
VIBRATION - IN ACCORDANCE WITH MIL-C5809	SINE - REQUIRED HIGH LEVEL SINE - (OPTIONAL) RANDOM - (OPTIONAL)
SHOCK	50G, MIL-STD-202, METHOD 213, CONDITION A
ACCELERATION	10G

REQUIREMENTS:

1. HIGH TEMPERATURE VIBRATION TESTS SHALL BE CONDUCTED AT 121°C RATHER THAN 71°C.
2. THE PART NUMBERS FOR CIRCUIT BREAKERS IN ACCORDANCE WITH THIS SPECIFICATION SHALL CONFORM TO THE EXAMPLE BELOW.

MS3320 - D5VL



WHEN A DESIGNATOR IS NOT APPLICABLE IT SHALL BE OMITTED FROM THE PART NUMBER.

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			MS 3320	
PROCUREMENT SPECIFICATION MIL-C-5809		SUPERSEDES:	SHEET 3 OF 6	

REQUIREMENTS: (Continued)

3. ALL QUALIFICATION INSPECTION TESTS REQUIRED BY MIL-C-5809 SHALL BE PERFORMED EXCEPT FOR THE FOLLOWING CHANGES:
- TEST GROUP I - OVERLOAD CALIBRATION SHALL BE PERFORMED AT 200% OF RATED CURRENT ONLY.
 - TEST GROUPS II AND III - DO NOT PERFORM THE VOLTAGE DROP TEST.
 - TEST GROUP IV AND X - PERFORM THE AMBIENT EFFECT ON CALIBRATION TEST ONLY AT +121°C.
 - ADD TEST GROUP XXIV - 2 SAMPLES. INTERRUPTION CAPACITY - LINE TO LINE (AC). THESE SAMPLES SHALL BE SUBJECTED TO THE INTERRUPTING CAPACITY TEST AS FOLLOWS:

TABLE V					
TEST NO.	SYSTEM	VOLTAGE BEFORE FAULT	CALIBRATED FAULT CURRENT AMPERES	TRANSIENT VOLTAGE AFTER CALIBRATED FAULT CURRENT INTERRUPTION (V)	OPEN CIRCUIT VOLTAGE
A	400 CYCLE 115/200 VOLT	200 ± 8V	1200A IN 10 TO 25 CYCLES AFTER FAULT INITIATION THROUGH TWO CIRCUIT BREAKERS IN SERIES POWER FACTOR .4 TO .5 LAGGING	208 WITHIN 3 CYCLES 260 WITHIN 6 CYCLES 286 MAXIMUM	200 ± 8V

- e. ADD TEST GROUP XXV-5 SAMPLES OF EACH RATING. EACH OF THESE 5 SAMPLES SHALL BE SUBJECTED TO THE TESTS IN TABLE VII AND SHALL MEET THE REQUIRED LIMITS SHOWN. THESE 5 SAMPLES SHALL NOT BE SUBJECTED TO TEST GROUP I.

- (1) THESE TESTS SHALL BE PERFORMED WITH 36 INCH WIRES CONFORMING TO MIL-W-22759/4 OR MS25471 AND TERMINATIONS AS SPECIFIED BELOW. ALL OTHER TESTS CALLING FOR WIRE LEADS SHALL BE PERFORMED AS SPECIFIED IN MIL-C-5809

(N)

NOMINAL CURRENT RATING (AMPERES)	WIRE SIZE (AWG)	INSULATED TERMINAL LUG (MS PART NO.)
0.5 (1/2)	22	MS25036-103
0.75 (3/4)	22	-103
1	22	-103
1.5	22	-103
2	22	-103
2.5	22	-103
3	22	-103
4	22	-103
5	22	-103
7.5 (7 1/2)	22	-103
10	20	-103
15	18	-103
20	16	-108

- (2) THESE TESTS SHALL BE PERFORMED AS FOLLOWS: AFTER THE CIRCUIT BREAKER HAS BEEN CARRYING THE MINIMUM LIMIT OF ULTIMATE TRIP CURRENT FOR THE SPECIFIED TEST CONDITIONS FOR ONE HOUR THE CURRENT SHALL BE INCREASED AT A RATE OF 2% OF RATED CURRENT PER 5 MINUTES UNTIL TRIPPING OCCURS OR UNTIL THE MAXIMUM LIMIT OF ULTIMATE TRIP IS REACHED FOR THESE CONDITIONS. IF THE MAXIMUM LIMIT OF ULTIMATE TRIP CURRENT IS REACHED BEFORE TRIPPING OCCURS, THE CURRENT SHALL BE HELD AT THIS VALUE FOR 55 MINUTES, DURING WHICH TRIPPING MUST OCCUR.
- (3) THIS VOLTAGE DROP TEST SHALL BE PERFORMED AT THE MINIMUM LIMIT OF ULTIMATE TRIP CURRENT FOR THESE TEST CONDITIONS. THE REQUIRED LIMIT FOR THIS CASE SHALL BE PROPORTIONALLY CHANGED.
- (4) A NON-TRIPPING OVERLOAD IS A SINGLE DC RECTANGULAR PULSE WHICH HAS A MAGNITUDE EQUAL TO THE FASTEST TRIP TIME FOR THE CORRESPONDING PERCENT OVERLOAD UNDER THE SPECIFIED TEST CONDITION. THERE SHALL BE NO CIRCUIT BREAKER TRIPPING DURING THE NON-TRIPPING OVERLOAD TESTS.

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INTER-
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INTEREST
*

TITLE

CIRCUIT BREAKER - AIRCRAFT, TRIP-FREE, PUSH PULL,
1/2 THRU 20 AMPS, TYPE 1
-55 TO +121°C

MILITARY STANDARD

MS3320

PROCUREMENT SPECIFICATION
MIL-C-5809

SUPERSEDES:

SHEET 4 OF 6

DD FORM 1 MAY 72 672-1 (Coordinated)

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PLATE NO. 22006

APPROVED 1 MAY 1968
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REQUIREMENTS: (Continued)

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- f. ADD TEST GROUP XXVI - 1 SAMPLE. THERMAL SHOCK: THIS SAMPLE SHALL BE SUBJECTED TO A THERMAL SHOCK TEST IN ACCORDANCE WITH MIL-STD-202, METHOD 107B, UNDER THE FOLLOWING TEST CONDITIONS AT SEA LEVEL.

TABLE VI		
STEP	TEMPERATURE °C(±2°C)	TIME MINUTES
1	-55	120 MIN.
2	+25	5 MAX.
3	+121	120 MIN.
4	+25	5 MAX.

THE CIRCUIT BREAKER SHALL CARRY 90% OF RATED CURRENT WHILE IN EACH CHAMBER AND WHILE BEING MOVED FROM EACH CHAMBER TO ROOM TEMPERATURE. THE CURRENT SHALL BE MAINTAINED FOR AT LEAST TWO MINUTES AFTER THE MOVE FROM EACH CHAMBER TO ROOM TEMPERATURE. THERE SHALL BE NO TRIPPING DURING THIS TEST. WIRE GAUGES, TERMINALS AND TYPES DURING THIS TEST SHALL BE IN ACCORDANCE WITH TABLE V.

- g. THE QUALIFICATION TEST REPORT SHALL RECORD ALL ACTUAL MEASUREMENTS NOTED DURING THE TESTING TO INDICATE THE DEGREE OF COMPLIANCE WITH SPECIFICATION REQUIREMENTS.

TEST CONDITIONS - TABLE VII				
TEST	AMBIENT TEMP °C (±2°C)	ALTITUDE (FEET)	CIRCUIT BREAKER PRELOAD % OF RATING	REQUIRED LIMITS
EXAMINATION OF PRODUCT	+25	0	0	
DIELECTRIC WITHSTANDING VOLTAGE	+25	0	0	1500 VOLTS
	-55	0	0	1500 VOLTS
	+121	70,000	0	500 VOLTS
INSULATION RESISTANCE	+25	0	0	100 MEGOHMS
	-55	0	0	100 MEGOHMS
	+121	70,000	0	100 MEGOHMS
VOLTAGE DROP	+25	0	0	SEE TABLE I
	-55	0	0	SEE TABLE I
	+121	70,000	0	SEE TABLE I
MINIMUM LIMIT OF ULTIMATE TRIP (TESTING TIME ONE HOUR)	+25	0	0	115% RATED CURRENT
	-55	0	0	115% RATED CURRENT
	+121	70,000	0	80% RATED CURRENT
MAXIMUM LIMIT OF ULTIMATE TRIP	+25	0	0	138% RATED CURRENT
	-55	0	0	160% RATED CURRENT
	+121	70,000	0	138% RATED CURRENT
OVERLOAD CALIBRATION	200%	+25	0	5-20 SEC.
		-55	0	7-40 SEC.
		+121	70,000	1.5 TO 13.0 SEC.
		+121	70,000	0.4 TO 8.0 SEC.
	500%	+25	0	.5 TO 2.0 SEC.
		-55	0	.5 TO 3.0 SEC.
		+121	70,000	0.15 TO 1.1 SEC.
		+121	70,000	0.06 TO 0.8 SEC.
	1000%	+25	0	.12 TO .53 SEC.
		-55	0	.16 TO .80 SEC.
		+121	70,000	.035 TO .30 SEC.
		+121	70,000	.014 TO .21 SEC.
NON-TRIPPING OVERLOADS	200%	+121	70,000	NO TRIP
		+121	70,000	NO TRIP
	500%	+121	70,000	NO TRIP
		+121	70,000	NO TRIP
	1000%	+121	70,000	NO TRIP
		+121	70,000	NO TRIP

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PROCUREMENT SPECIFICATION MIL-C-5809	SUPERSEDES:	SHEET 5 OF 6	

DD FORM 672-1 (Coordinated)

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PLATE NO. 23065

APPROVED 1 MAY 1968 REVISED (N) FOR CHANGES SEE SHEETS 1 THRU 6

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4. CIRCUIT BREAKERS MEETING THE RANDOM VIBRATION REQUIREMENTS OF MIL-STD-202, METHOD 214-1 SHALL BE DESIGNATED BY ADDING APPROPRIATE PREFIX LETTER TO THE MS DASH NUMBER.

NOTES:

1. VOLTAGE RATING: 28 VDC NOMINAL OR 115V 400 HZ NOMINAL.
2. PREFERRED PARTS HAVE STANDARD LENGTH PUSHBUTTONS.
3. DIMENSIONS ARE IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS $\pm .031$.
4. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THE STANDARD SHALL TAKE PRECEDENCE.

*CERTAIN PROVISIONS OF THIS STANDARD ARE THE SUBJECT OF INTERNATIONAL STANDARDIZATION AGREEMENT ASCC AIR STD 12/3 WHEN REVISION OR CANCELLATION OF THIS STANDARD IS PROPOSED WHICH WILL AFFECT OR VIOLATE THE INTERNATIONAL AGREEMENT CONCERNED, THE PREPARING ACTIVITY WILL TAKE APPROPRIATE RECONCILIATION ACTION THROUGH INTERNATIONAL STANDARDIZATION CHANNELS, INCLUDING DEPARTMENTAL STANDARDIZATION OFFICES, IF REQUIRED.

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