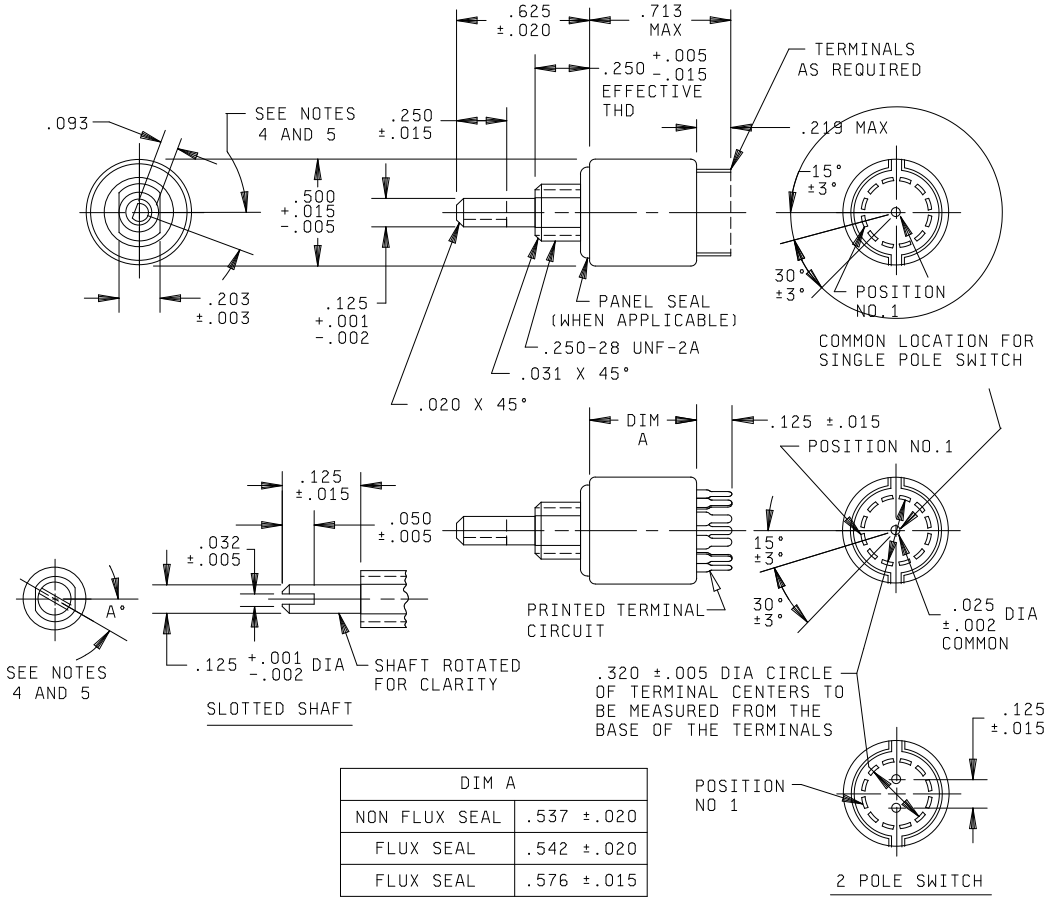
INCH-POUND
MIL-DTL-3786/20K
15 April 2010
SUPERSEDING
MIL-DTL-3786/20J
26 March 2003

DETAIL SPECIFICATION SHEET

SWITCH, ROTARY, CLOSED CONSTRUCTION, EXPLOSION PROOF, FLUX SEAL, .500 INCH DIAMETER, .200 AMPERE, STYLE SR20

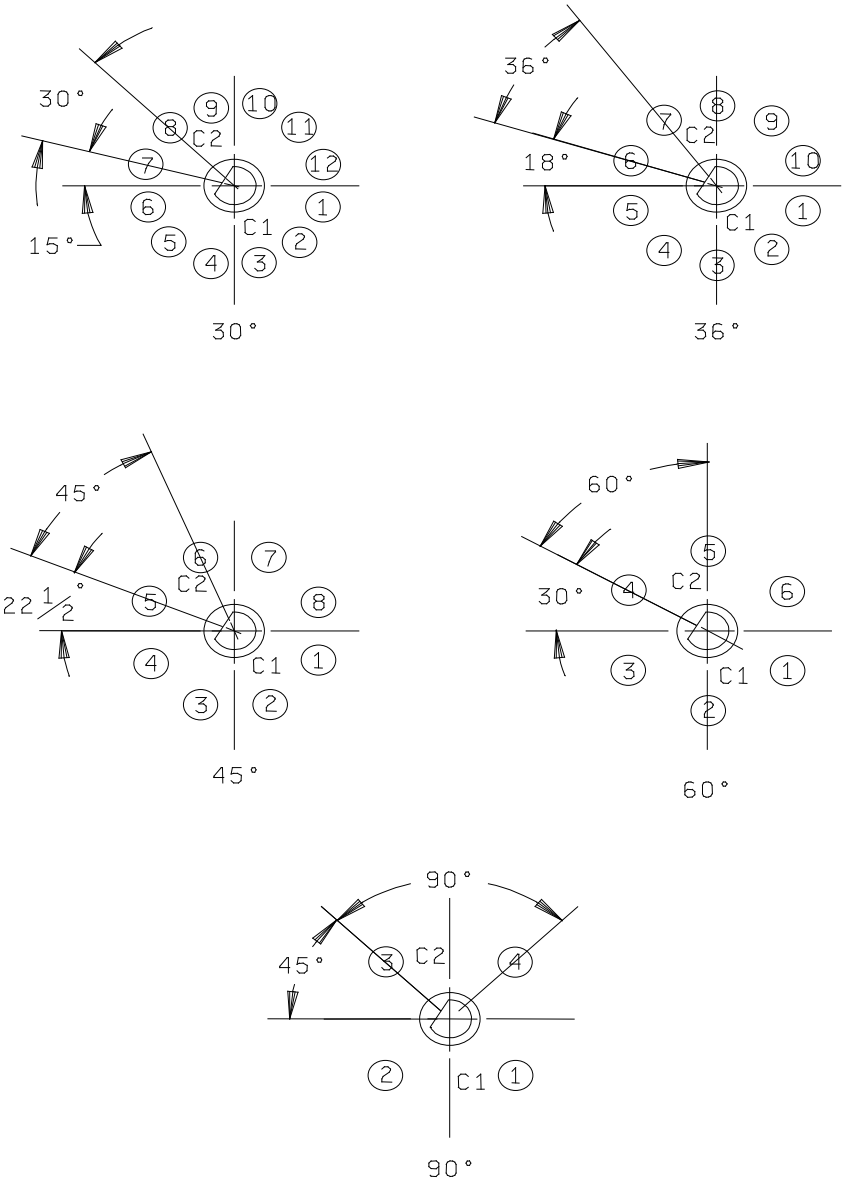
This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the switches described herein shall consist of this specification sheet and MIL-DTL-3786.



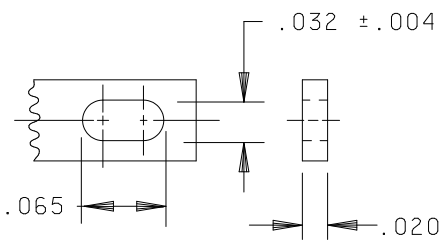
DIM A	
NON FLUX SEAL	.537 ±.020
FLUX SEAL	.542 ±.020
FLUX SEAL	.576 ±.015

FIGURE 1. Dimensions and configurations.

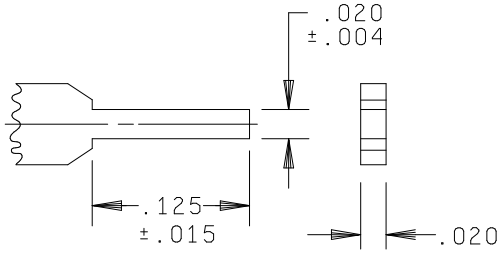


FRONT VIEW OF TERMINAL CONFIGURATIONS

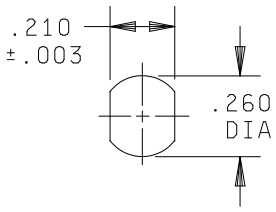
FIGURE 1. Dimensions and configurations - Continued.



SOLDER LUG TERMINAL



PRINTED CIRCUIT TERMINAL



MOUNTING HOLE

Inches	mm	Inches	mm	Inches	mm
.001	0.03	.020	0.51	.210	5.33
.002	0.05	.031	0.79	.219	5.56
.003	0.08	.032	0.81	.250	6.35
.004	0.10	.050	1.27	.260	6.60
.005	0.13	.065	1.65	.500	12.70
.007	0.18	.093	2.36	.576	14.63
.015	0.38	.125	3.18	.625	15.88
		.203	5.16	.713	18.11

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ±.005 (0.13 mm) and ±3 degrees on angles (noncummulative).
4. Shaft flat angle A° is the angle between a line through the center of the shaft perpendicular to the mounting bushing flats and another line through the center of the shaft perpendicular to the mounting bushing flats and another line through the center of the shaft and perpendicular to the shaft flat with switch in position one. For slotted switches, the slot is in line with the point of contact for pole number one.
5. Position number one and terminal number one coincide.

FIGURE 1. Dimensions and configurations - Continued.

REQUIREMENTS:

Dimensions and configuration: See figure 1. Angle A° of 15° for switches of 30° angle of throw, 18° for switches of 36° angle of throw, 22.5° for switches of 45° angle of throw, 30° for switches of 60° angle of throw, and 45° for switches of 90° angle of throw.

Angle of throw: 30°, 36°, 45°, 60°, 90°.

Construction styles: Symbols E, F, J, and K.

Insulation: Symbol P (plastic).

Mounting hardware: Each switch shall be provided with one corrosion-resistant steel hexagon nut, .089 ±.010 inch (2.26 mm ±0.254 mm) thick by .375 inch (9.53 mm) across the flats and one internal-toothed lockwasher, .402 ±.006 (10.21 mm ± .152 mm) outside diameter.

Temperature-life characteristic: B (25,000 cycles) (-65°C and +85°C).

Vibration grade: 3 (10 Hz to 2,000 Hz).

Shock symbol: B (medium and high impact).

Altitude: C (70,000 feet).

Terminal strength (pull): A force of 1.5 pounds shall be applied to the terminals.

Terminal marking: Switches may be marked with terminal numbers on side of switch.

Stop strength: Stops shall withstand a force of 7.5 inch-pounds.

Flux seal: Applicable when specified in the Part or Identifying Number (PIN).

Low level circuit life: Applicable when specified in PIN.

Positive shaft grounding: Applicable when specified in PIN.

Rotational torque: The minimum and maximum value of torque determined for shaft rotation shall be within limits specified in table I.

TABLE I. Rotational-torque limits.

Temperature	Torque (in-lb)	
	Minimum	Maximum
Room	0.5	1.5
Minimum	0.5	2.0

Life (rotational): The test loads for the applicable circuit conditions shall be as specified in table II. Each of the loads, specified for the applicable environmental condition, shall be switched by at least one rotor contact of the switch. Low level circuit life is applicable as specified by PIN.

TABLE II. Electrical loads.

Environmental condition	Lamp load (tungsten)		Inductive load		Resistive load	
	mA	V dc	mA	V dc	mA	Volts
At atmospheric pressure 1/	100	28	30	28	200	28 dc
					75	115 V rms 60 Hz
At reduced barometric pressure	---	---	---	---	200	28 dc
					75	115 V rms 60 Hz

1/ The contact resistance (applicable to ac and dc), after life test, shall not exceed 50 milliohms.

Dielectric withstanding voltage: The magnitude of test voltage for the dielectric withstanding voltage shall be 600 V ac at temperature pressure and 250 V ac at reduced pressure.

Test procedure on lamp load at atmospheric: The test procedure on lamp at atmospheric pressure shall be as follows:

Test potential and load: One pole on four switches, each for atmospheric and at reduced barometric pressure, shall be energized by the specified lamp load. A common terminal and one selected terminal shall be arranged to be “on” once per cycle. The next selected terminal shall be unloaded. Suitable means shall be provided to indicate when contacts have failed to make and break.

Ordering data: Acquisition documents should specify the following:

a. Title, number, and date of this specification sheet, and the military PIN as listed in table III, example A, or table IV, table V, and table VI, example B.

b. For switches not listed in table III, table IV, table V, and table VI, acquisition shall be in accordance with the ordering data of MIL-DTL-3786 (for switches covered by specification sheets but not by military PIN’s).

c. Switches covered are style SR20 units.

PIN: The PIN shall be assigned using example A, which consists of a dash number from table III, and appropriate suffix letter as required. If the desired characteristics are not defined, the PIN shall be assigned by using the code letters from table IV, table V, and table VI as described in example B illustrated below:

Example A: Nonflux-sealed, slotted terminal switches M3786/20-351 T G L

- Switching characteristics (see table III)
- Add the letter T when a slotted shaft is required
- Add the letter G if positive shaft grounding is required
- Add the letter L for low level requirement

NOTE: M3786/351TGL identifies a nonflux-sealed rotary switch of construction E, temperature-life characteristic B, a 45° angle of throw, two poles per deck, three positions, nonshorting switching characteristics, slotted shaft, with low level and ground shaft.

Example B: Flux-sealed switches: M3786/20-G E CL

- Switching characteristics, type of shaft and length of housing (see table IV)
- Type construction, low level capability shaft grounding, and type of termination (see table V)
- Angle of throw, poles per deck and number of positions per pole (see table VI)

NOTE: M3786/20-GECL identifies a flux-sealed rotary switch that is explosion proof, flux proof, closed construction, sealed shaft and panel seal, with a flatted shaft, .542 ± .020 inches (13.21 ± .51 mm), nonshorting switching characteristics, a 45° angle of throw, 2 poles, 4 positions per pole, construction type K, a grounded shaft with low level capabilities and printed circuit termination.

TABLE III. Switching characteristics and PIN's: Nonflux-sealed, slotted terminal switches.

PIN M3786/20- Construction: F Temperature-life characteristic: B	PIN M3786/20- Construction: E Temperature-life characteristic: B	Angle of throw	Number of poles	Position per pole	Switching characteristic (S or NS)
001	301	36	1	2	S
002	302	36	1	3	S
003	303	36	1	4	S
004	304	36	1	5	S
005	305	36	1	6	S
006	306	36	1	7	S
007	307	36	1	8	S
008	308	36	1	9	S
009	309	36	1	1/ 10	S
010	310	36	2	2	S
011	311	36	2	3	S
012	312	36	2	4	S
013	313	36	2	5	S
014	314	36	1	2	NS
015	315	36	1	3	NS
016	316	36	1	4	NS
017	317	36	1	5	NS
018	318	36	1	6	NS
019	319	36	1	7	NS
020	320	36	1	8	NS
021	321	36	1	9	NS
022	322	36	1	1/ 10	NS
023	323	36	2	2	NS
024	324	36	2	3	NS
025	325	36	2	4	NS
026	326	36	2	5	NS
027	327	60	1	2	S
028	328	60	1	3	S
029	329	60	1	4	S
030	330	60	1	5	S
031	331	60	1	1/ 6	S
032	332	60	2	2	S
033	333	60	2	3	S
034	334	60	3	2	S
035	335	60	1	2	NS
036	336	60	1	3	NS
037	337	60	1	4	NS
038	338	60	1	5	NS
039	339	60	1	1/ 6	NS
040	340	60	2	2	NS

See footnote at end of table.

TABLE III. Switching characteristics and PIN's: Nonflux-sealed, slotted terminal switches.

PIN M3786/20- Construction: F Temperature-life characteristic: B	PIN M3786/20- Construction: E Temperature-life characteristic: B	Angle of throw	Number of poles	Position per pole	Switching characteristic (S or NS)
041	341	60	2	3	NS
042	342	60	3	2	NS
043	343	45	1	2	NS
044	344	45	1	3	NS
045	345	45	1	4	NS
046	346	45	1	5	NS
047	347	45	1	6	NS
048	348	45	1	7	NS
049	349	45	1	1/ 8	NS
050	350	45	2	2	NS
051	351	45	2	3	NS
052	352	45	2	4	NS
053	353	36	1	10	S
054	354	36	1	10	NS
055	355	60	1	6	S
056	356	60	1	6	NS
057	357	45	1	8	NS
058	358	36	3	2	S
059	359	36	3	3	S
060	360	36	4	2	S
061	361	36	3	2	NS
062	362	36	3	3	NS
063	363	36	4	2	NS
064	364	30	1	2	S
065	365	30	1	3	S
066	366	30	1	4	S
067	367	30	1	5	S
068	368	30	1	6	S
069	369	30	1	7	S
070	370	30	1	8	S
071	371	30	1	9	S
072	372	30	1	10	S
073	373	30	1	11	S
074	374	30	1	1/ 12	S
075	375	30	1	12	S
076	376	30	2	2	S
077	377	30	2	3	S
078	378	30	2	4	S
079	379	30	2	5	S
080	380	30	2	6	S
081	381	30	3	2	S
082	382	30	3	3	S
083	383	30	4	2	S
084	384	30	4	3	NS

See footnote at end of table.

TABLE III. Switching characteristics and PIN's: Nonflux-sealed, slotted terminal switches.

PIN M3786/20- Construction: F Temperature-life characteristic: B	PIN M3786/20- Construction: E Temperature-life characteristic: B	Angle of throw	Number of poles	Position per pole	Switching characteristic (S or NS)
085	385	30	1	2	NS
086	386	30	1	3	NS
087	387	30	1	4	NS
088	388	30	1	5	NS
089	389	30	1	6	NS
090	390	30	1	7	NS
091	391	30	1	8	NS
092	392	30	1	9	NS
093	393	30	1	10	NS
094	394	30	1	11	NS
095	395	30	1	1/ 12	NS
096	396	30	1	12	NS
097	397	30	2	2	NS
098	398	30	2	3	NS
099	399	30	2	4	NS
100	400	30	2	5	NS
101	401	30	2	6	NS
102	402	30	3	2	NS
103	403	30	3	3	NS
104	404	30	4	2	NS
105	405	30	4	3	NS

1/ Continuous rotation.

TABLE IV. Switching characteristics and type of shaft.

Code letter	Switching characteristics	Shaft type	Dimension "A" (figure 1)
A	Nonshorting	Flatted	.576 ± .015
B	Nonshorting	Slotted	.576 ± .015
C	Shorting	Flatted	.576 ± .015
D	Shorting	Slotted	.576 ± .015
E	Nonshorting	Flatted	.542 ± .020
F	Nonshorting	Slotted	.542 ± .020
G	Shorting	Flatted	.542 ± .020
H	Shorting	Slotted	.542 ± .020

TABLE V. Code letter for type construction, low level capability, shaft grounding, and type of termination. 1/

Code letter	Type construction	Low level capability	Shaft grounding	PC terminals	Solder lug terminals
A	J	Yes	Yes	Yes	No
B	J	Yes	No	Yes	No
C	J	No	Yes	Yes	No
D	J	No	No	Yes	No
E	K	Yes	Yes	Yes	No
F	K	Yes	No	Yes	No
G	K	No	Yes	Yes	No
H	K	No	No	Yes	No
J	J	Yes	Yes	No	Yes
K	J	Yes	No	No	Yes
L	J	No	Yes	No	Yes
M	J	No	No	No	Yes
N	K	Yes	Yes	No	Yes
P	K	Yes	No	No	Yes
S	K	No	Yes	No	Yes
T	K	No	No	No	Yes

1/ Applicable to J and K constructions only.

TABLE VI. Code letter for combination of angle of throw poles per deck, and number of positions per pole.

Code letter	Angle of throw	Poles per deck 1/	Number of positions	Code letter	Angle of throw	Poles per deck 1/	Number of positions	Code letter	Angle of throw	Poles per deck 1/	Number of positions
AA	30	1	2	BD	36	1	7	CG	60	1	4
AB	30	1	3	BE	36	1	8	CH	60	1	5
AC	30	1	4	BF	36	1	9	CJ	60	1	6
AD	30	1	5	BG	36	1	10	CK	60	1	2/ 6
AE	30	1	6	BH	36	1	2/ 10	CL	60	2	2
AF	30	1	7	BJ	36	2	2	CM	60	2	3
AG	30	1	8	BK	36	2	3	CN	90	1	2
AH	30	1	9	BL	36	2	4	CP	90	1	3
AJ	30	1	10	BM	36	2	5	CR	90	1	4
AK	30	1	11	BN	45	1	2	CT	90	1	2/ 4
AL	30	1	12	BP	45	1	3	CV	90	2	2
AM	30	1	2/ 12	BR	45	1	4				
AN	30	2	2	BT	45	1	5				
AP	30	2	3	BV	45	1	6				
AR	30	2	4	BW	45	1	7				
AT	30	2	5	BY	45	1	8				
AV	30	2	6	CA	45	1	2/ 8				
AW	36	1	2	CB	45	2	2				
AY	36	1	3	CC	45	2	3				
BA	36	1	4	CD	45	2	4				
BB	36	1	5	CE	60	1	2				
BC	36	1	6	CF	60	1	3				

1/ Switches with PC terminations are available in one and two pole configurations only.
2/ Continuous rotation.

Referenced documents:
MIL-DTL-3786

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Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-2010-023)

Review activities:
Army – AR, AT, AV, CR4, MI, SM
Navy - AS, CG, MC, OS
Air Force - 19, 99

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