

N243N Wire Name	Length (ft)	Wire	Load	Normal Current (A)	Max Regulated V dc	Is Nominal current less than or equal to fuse current?	Watts at Normal Current (W)	Circuit Brkr (A)	Watts at Fuse Amp	Allowable Voltage Drop < 0.5 per AC 43.13.1b, Fig 11-2, TA 11-6	Wire Gage Based on Volt Drop Normal Current Fig. 11-2	Wire Gage Based on Circuit Brkr Current Ta 11-9	Choose Wire Gage MIL-W-22759/16 150C	Comment	Switch	Notes
NAV, Tail	25	MIL-W-22759/16 150C	Bulb, GE 1777 12.8 V, 1.52 A	1.52	14	TRUE	21.28	10.0	140	0.5	20	16	16	Common switch for all NAV lights		Per Ta 11-3, 16 gage wire allows 15 A CB - so 10 A CB OK; 7.5 A breaker for two 2 A and one 1.5 A load should be OK
Landing Light, Wing	25	MIL-W-22759/16 150C	Bulb, GE 4509, 100 W at 13 V dc	7.69	14	TRUE	107.69	10.0	140	0.5	12	16	12 (STC SA1-436 says 14 gage)	Double pole, double throw switch; one side ldg; one side taxi. Center off, up ldg and taxi; bottom taxi. OR-COULD-JUST-HAVE-UP-LDG-AND-BOTTOM-TAXI	DPDT AN 3027-1 (MS35059-21) my modification rated 7 A per pole at 28 volts for lamp load. STC SA1-436 calls for SPST AN3021-2 (MS35058-22)	AN 3027-1 switch is rated for 7 amp resistive load and 20 amp resistive load at 28 vdc. Assume this is power based, so it would double to 14 A and 40 A at 14 V; Per Ta 11-3, 16 gage wire allows 15 A CB - so 10 A CB OK
Taxi Light, Wing	25	MIL-W-22759/16 150C	Bulb, GE 4509, 100 W at 13 V dc	7.69	14	TRUE	107.69	10.0	140	0.5	12	16	12 (STC SA1-436 says 14 gage)	Double pole, double throw switch; one side ldg; one side taxi. Center off, up ldg and taxi; bottom taxi. OR-COULD-JUST-HAVE-UP-LDG-AND-BOTTOM-TAXI	DPDT AN 3027-1 (MS35059-21) my modification rated 7 A per pole at 28 volts for lamp load. STC SA1-436 calls for SPST AN3021-2 (MS35058-22)	Per Ta 11-3, 14 gage wire allows 20 A CB - so 10 A CB OK
NAV, Wing Tip Right	25	MIL-W-22759/16 150C	Bulb, Whelen 12703 W12014 14V, 26W uses M22759/43-18 wire pigtail. 2A at 14V	2	14	TRUE	28.00	10.0	140	0.5	20	16	16	Common switch for all NAV lights		Per Ta 11-3, 16 gage wire allows 15 A CB - so 10 A CB OK
NAV, Wing Tip Left	25	MIL-W-22759/16 150C	Bulb, Whelen 12703 W12014 14V, 26W uses M22759/43-18 wire pigtail. 2A at 14V	2	14	TRUE	28.00	10.0	140	0.5	20	16	16	Common switch for all NAV lights		Per Ta 11-3, 16 gage wire allows 15 A CB - so 10 A CB OK
HDACF Strobe Light Power Supply	10	MIL-W-22759/16 150C	7.0 A at 14 VDC	7	14	TRUE	98.00	10.0	140	0.5	16	18	16			Whelen HDACF power supply install instructions say use 18 AWG wire. PER TA 11-3, 16 AWG WIRE ALLOWS 15 A CB, SO 10 A CB IS OK.
Strobes A650PG/PR	30	Whelen Provided HD-60 3-cond shielded is 16 AWG	450 vdc capacitive discharge													
Stall warning indicator	25	MIL-W-22759/16 150C	0.5 A stall horn marking Mdl R Safeflight. Lift Detector is Safe Flight 164 with 2A resistive, 1 A inductive rating per DWG 164-500. IPC Fig. 78-5 shows Klixon CA-2 amp CB	0.5	14	TRUE	7.00	2.0	28	0.5	24 at 0.5A 22 for 1 A 20 for 2A	24 for 4A	22	Put dome light and stall warning on same 2A breaker		Ta 11-3 says can go with a 5 A CB for 22 gage wire, so CB-2A is OK

Dome Light, bulb GE 1816 or 1816R. Alt 11-10951, 11-12395	8	MIL-W-22759/16 150C	330 mA at 13Vdc	0.33	14	TRUE	4.62	2.0	28	0.5	24 for 2A > 0.33 A	smaller than 24 AWG at 2 amp since 24 AWG handles 4A 150C	22 AWG FOR 2A CB Put dome light and stall 18 AWG FOR 10A CB warning on same 2A breaker	MS27718-22-1 15/32 OTTO T3-11121 1 AMP LAMP LOAD AT 28 VDC	Ta 11-3 says can go with a 5 A CB for 22 gage wire, so CB-2A is OK, NOW IF PUT THIS ON A 10 A BREAKER WITH NAV LIGHTS, THEN PIGTAIL TO SWITCH SHOULD BE 18 AWG to handle 10A load before CB opens
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Panel Nulites. 80 mA each normal or 125 mA max. Eight Nulites draw about 1 Amp per spec sheet. Spec sheet recommends 3 amp CB, and up to 8 Nulites can be chained together with just their wire. More than 8 use 20 AWG jumper

	3	MIL-W-22759/16 150C	8 NULITES = 1 AMP	0.125	14	TRUE	1.75	3	42	0.5					
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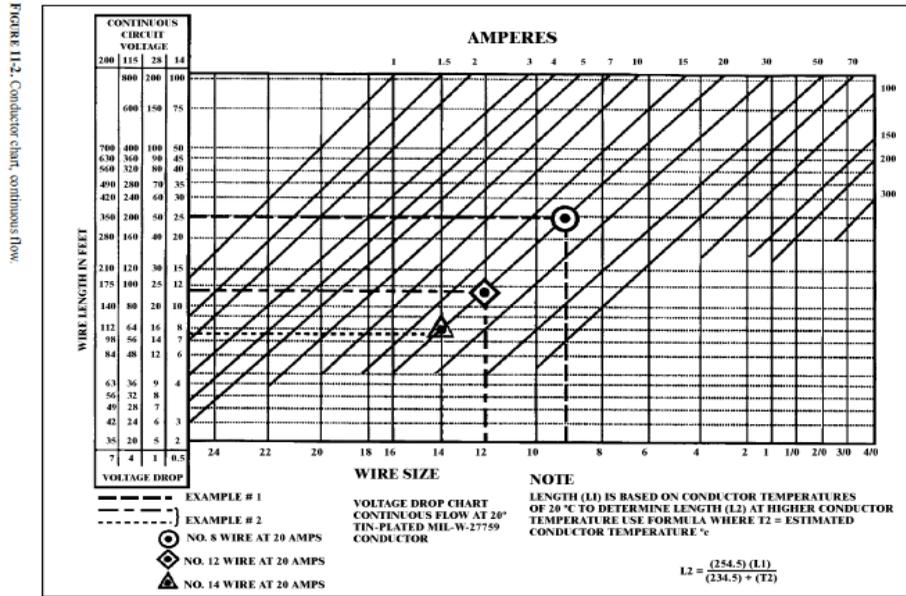


FIGURE 11-2. Conductor chart, continuous flow.

b. Voltage Drop in Wires. The voltage drop in the main power wires from the generation source or the battery to the bus should not exceed 2 percent of the regulated voltage when the generator is carrying rated current or the battery is being discharged at the 5-minute rate. The tabulation shown in table 11-6 defines the maximum acceptable voltage drop in the load circuits between the bus and the utilization equipment ground.

TABLE 11-6. Tabulation chart (allowable voltage drop between bus and utilization equipment ground).

Nominal system voltage	Allowable voltage drop continuous operation	Intermittent operation
14	0.5	1
28	1	2
115	4	8
200	7	14

TABLE 11-3. DC wire and circuit protector chart.

Wire AWG gauge copper	Circuit breaker amp.	Fuse amp.
22	5	5
20	7.5	5
18	10	10
16	15	10
14	20	15
12	30	20
10	40	30
8	50	50
6	80	70
4	100	70
2	125	100
1		150
0		150

Basis of chart:
 (1) Wire bundles in 135 °F. ambient and altitudes up to 30,000 feet.
 (2) Wire bundles of 15 or more wires, with wires carrying no more than 20 percent of the total current carrying capacity of the bundle as given in Specification MIL-W-5088 (ASG).
 (3) Protectors in 75 to 85 °F. ambient.
 (4) Copper wire Specification MIL-W-5088.
 (5) Circuit breakers to Specification MIL-C-5809 or equivalent.
 (6) Fuses to Specification MIL-F-15160 or equivalent.

TABLE 11-4. Switch

Nominal System Voltage	
28 VDC	Lan
28 VDC	Ind
28 VDC	Res
28 VDC	Mot
12 VDC	Lan
12 VDC	Ind
12 VDC	Res
12 VDC	Mot

NOTES:
 1. To find the nominal system voltage of the device, divide the voltage at the device by the voltage at the device.
 2. To find the continuous current rating of the device, divide the nominal current rating by the device correction factor.

TABLE 11-9. Current carrying capacity and resistance of copper wire.

Wire Size	Continuous duty current (amps)-Wires in bundles, groups, harnesses, or conduits. (See Note #1)			Max. resistance ohms/1000ft@20 °C tin plated conductor (See Note #2)	Nominal conductor area - circ.mils
	Wire Conductor Temperature Rating				
	105 °C	150 °C	200 °C		
24	2.5	4	5	28.40	475
22	3	5	6	16.20	755
20	4	7	9	9.88	1,216
18	6	9	12	6.23	1,900
16	7	11	14	4.81	2,426
14	10	14	18	3.06	3,831
12	13	19	25	2.02	5,874
10	17	26	32	1.26	9,354
8	38	57	71	0.70	16,983
6	50	76	97	0.44	26,818
4	68	103	133	0.28	42,615
2	95	141	179	0.18	66,500
1	113	166	210	0.15	81,700
0	128	192	243	0.12	104,500
00	147	222	285	0.09	133,000
000	172	262	335	0.07	166,500
0000	204	310	395	0.06	210,900

Note #1: Rating is for 70°C ambient, 33 or more wires in the bundle for sizes 24 through 10, and 9 wires for size 8 and larger, with no more than 20 percent of harness current carrying capacity being used, at an operating altitude of 60,000 feet. For rating of wires under other conditions or configurations see paragraph 11-69.
Note #2: For resistance of silver or nickel-plated conductors see wire specifications.

1.6625

AC 43-13.1b, Ta. 11-4 says multiply cont
current rating of device (bulb) x 5 for 14 V
system to get continuous rating of switch.
 $7.69 \text{ A} \times 5 = 38.45 \text{ A} < 40 \text{ A}$

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ch derating factors.

Type of Load	Derating Factor
mp	8
uctive (relay-solenoid)	4
istive (Heater)	2
lor	3
mp	5
uctive (relay-solenoid)	2
istive (Heater)	1
lor	2

inal rating of a switch required to operate
multiply the continuous current rating
the derating factor corresponding
nd type of load.

inuous rating that a switch of a
ating will handle efficiently,
h nominal rating by the derating
iding to the voltage and type of load.