Table and Chart Info Extracted from 2011 NEC

Maximum Conductor Ampacities per Gauge (run inside conduit) - from NEC Table 310.15 (B)(16) (formerly Table 310.16)

AWG	USE-2, PV Wire, THWN-2 Copper 90° Celsius	
14	25	
12	30	*Also applies to these wire types: TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, XHH, XHHW, XHHW-2, ZW 2*
10	40	
8	55	
6	75	
4	95	
3	110	
2	130	
1	150	
1/0	170	
2/0	195	
3/0	225	

Always pick a gauge whose ampacity (second column) is equal to or exceeds the value you calculate.

Maximum Conductor Ampacities per Gauge (in free air) - from NEC Table 310.15 (B)(17) (formerly Table 310.17)

AWG	USE-2, PV Wire, THWN-2 Copper 90° Celsius	
14	35	
12	40	*Also applies to these wire types: TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, XHH, XHHW, XHHW-2, ZW 2*
10	55	
8	80	
6	105	
4	140	
3	165	
2	190	
1	220	
1/0	260	
2/0	300	
3/0	350	

Ambient Temperature Correction Factor for Conductors - from NEC 310.15 (B)(2)(a)

Temp Celsius	USE-2, PV Wire, THWN-2 Copper 90° Celsius	
In Conduit and Free Air		
10 or less	1.15	
11-15	1.12	
16-20	1.08	
21-25	1.04	
26-30	1.00	
31-35	0.96	*Also applies to these wire types: TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, XHH, XHHW, XHHW-2, ZW-2*
36-40	0.91	
41-45	0.87	
46-50	0.82	
51-55	0.76	
56-60	0.71	
61-65	0.65	
66-70	0.58	
71-75	0.50	
76-80	0.41	
81-85	0.29	

To research temperatures, visit the site:

Solar ABC's

Scroll down for more tables...

NEC Tables and Charts cont...

Conduit Adjustment Factor for Multiple Conductors Inside Raceway - from NEC Table 310.15 (B)(3)(a)

Number of Conductors	Percentage Divider
Less than 3	100%
4-6	80%
7-9	70%
10-20	50%

"Number of Conductors" does not include the ground wire/EGC, which must also be run through the conduit. (Since current doesn't normally flow through it, the EGC contributes no heat inside the raceway.) In addition, the use of a combiner in the PV output circuit reduces the number of conductors entering the conduit.

Ambient Temperature Adder for Raceways on or Above Rooftops - from NEC Table 310.15 (B)(2)(C)

Distance Between Roof and Conduit	Celsius Temp Adder
0 to 1/2 inch	33
Above 1/2" to 3 1/2"	22
Above 3 1/2" to 12"	17
Above 12" to 36"	14

Installers use what's called a "lift" to elevate conduit running across a roof. The height of the lift will give you the data you need to use this table. If you place your junction box below the roof, you can skip this calculation, so long as the conduit doesn't cross the roof.

DC Conductor Properties for Voltage Drop Calculation - from NEC Chapter 9 Table 8

AWG	stranded or solid?	ohms per kilofoot
14	solid	3.07
14	stranded	3.14
12	solid	1.93
12	stranded	1.98
10	solid	1.21
10	stranded	1.24
8	solid	0.764
8	stranded	0.778
6	stranded	0.491
4	stranded	0.308
3	stranded	0.245
2	stranded	0.194
1	stranded	0.154
1/0	stranded	0.122

AC Conductor Properties for Voltage Drop Calculation - from NEC Chapter 9 Table 9

AWG	Effective Impedance per kilofoot
14	2.7
12	1.7
10	1.1
8	0.69
6	0.44
4	0.29
3	0.23
2	0.19
1	0.16
1/0	0.13
2/0	0.11
3/0	0.092

Scroll down for more tables...

Minimum Equipment Grounding Conductor (EGC) Size Based on Overcurrent Devices - from NEC Table 250.122

Overcurrent Device Rating (amps)	Minimum Gauge (AWG) Copper Wire
15	14
20	12
30	10
40	10
60	10
100	8
200	6
300	4

Note: Table does not apply when using a transformerless inverter

An O.C. device (*aka* fuse or circuit breaker) may be located inside the inverter, AC Disconnect, DC Disconnect, Combiner Box and/or the main panel. Normally, for less than three array strings, you don't need overcurrent protection on the DC side, but there are exceptions. This chart is generally used to size breakers in the inverter output circuit (on the AC side).

Temperature Conversion Formulas: Fahrenheit / Celsius

C = (F - 32) * 5 / 9

F = (C * 9 / 5) + 32

For an inverter 3800 watts or less, your breakers will be 15-20 amps on the AC side, and the EGC minimum gauge will be 12. For a 4,000-10,000 watt inverter, your breakers should be 30-60 amps on the AC side with an EGC minimum of 10 gauge. Many AHJ's, meanwhile, insist on Bare Copper gauge 6 for the array EGC. (After the junction box/combiner, you must switch to something else, since bare copper can't be run inside conduit.) Transformerless inverters require that all ground wires be rated for twice the largest upstream circuit ampacity.

Temperature Conversion Table

Celsius	F	Celsius	F	Celsius	F
0	32	19	66.2	38	100.4
1	33.8	20	68	39	102.2
2	35.6	21	69.8	40	104
3	37.4	22	71.6	41	105.8
4	39.2	23	73.4	42	107.6
5	41	24	75.2	43	109.4
6	42.8	25	77	44	111.2
7	44.6	26	78.8	45	113
8	46.4	27	80.6	46	114.8
9	48.2	28	82.4	47	116.6
10	50	29	84.2	48	118.4
11	51.8	30	86	49	120.2
12	53.6	31	87.8	50	122
13	55.4	32	89.6	51	123.8
14	57.2	33	91.4	52	125.6
15	59	34	93.2	53	127.4
16	60.8	35	95	54	129.2
17	62.6	36	96.8	55	131
18	64.4	37	98.6	56	132.8