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kVA and kW to Amps Chart

Full-load current for transformers and generators, single- and three-phase, 120 V to 600 V

For: Electricians, electrical engineers, generator and transformer installers, facilities managers

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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
Apparent power S (kVA) = √3 × V(line) × I ÷ 1000 for three-phase; V × I ÷ 1000 for single-phase	I = kVA × 1000 ÷ (√3 × V); I = kW × 1000 ÷ (√3 × V × PF)	kVA = √3 × V × I ÷ 1000; kW = kVA × PF	500 kVA at 480 V three-phase: 500,000 ÷ (1.732 × 480) = 601.4 A

Amps to 1 decimal place. Voltages are line-to-line for three-phase. Generators are usually rated at power factor 0.8.

Three-phase kVA to amps

kVA	208 V	220 V	380 V	400 V	415 V	440 V	480 V	600 V
3	8.3	7.9	4.6	4.3	4.2	3.9	3.6	2.9
6	16.7	15.7	9.1	8.7	8.3	7.9	7.2	5.8
9	25.0	23.6	13.7	13.0	12.5	11.8	10.8	8.7
15	41.6	39.4	22.8	21.7	20.9	19.7	18.0	14.4
30	83.3	78.7	45.6	43.3	41.7	39.4	36.1	28.9
45	124.9	118.1	68.4	65.0	62.6	59.0	54.1	43.3
50	138.8	131.2	76.0	72.2	69.6	65.6	60.1	48.1
75	208.2	196.8	114.0	108.3	104.3	98.4	90.2	72.2
100	277.6	262.4	151.9	144.3	139.1	131.2	120.3	96.2
112.5	312.3	295.2	170.9	162.4	156.5	147.6	135.3	108.3
125	347.0	328.0	189.9	180.4	173.9	164.0	150.4	120.3
150	416.4	393.6	227.9	216.5	208.7	196.8	180.4	144.3
200	555.1	524.9	303.9	288.7	278.2	262.4	240.6	192.5
225	624.5	590.5	341.9	324.8	313.0	295.2	270.6	216.5
250	693.9	656.1	379.8	360.8	347.8	328.0	300.7	240.6
300	832.7	787.3	455.8	433.0	417.4	393.6	360.8	288.7
400	1,110.3	1,049.7	607.7	577.4	556.5	524.9	481.1	384.9
500	1,387.9	1,312.2	759.7	721.7	695.6	656.1	601.4	481.1
630	1,748.7	1,653.3	957.2	909.3	876.5	826.7	757.8	606.2
750	2,081.8	1,968.2	1,139.5	1,082.5	1,043.4	984.1	902.1	721.7
800	2,220.6	2,099.5	1,215.5	1,154.7	1,113.0	1,049.7	962.3	769.8
1,000	2,775.7	2,624.3	1,519.3	1,443.4	1,391.2	1,312.2	1,202.8	962.3
1,250	3,469.7	3,280.4	1,899.2	1,804.2	1,739.0	1,640.2	1,503.5	1,202.8
1,500	4,163.6	3,936.5	2,279.0	2,165.1	2,086.8	1,968.2	1,804.2	1,443.4
2,000	5,551.4	5,248.6	3,038.7	2,886.8	2,782.4	2,624.3	2,405.6	1,924.5
2,500	6,939.3	6,560.8	3,798.4	3,608.4	3,478.0	3,280.4	3,007.0	2,405.6
3,000	8,327.2	7,873.0	4,558.0	4,330.1	4,173.6	3,936.5	3,608.4	2,886.8

Single-phase kVA to amps

kVA	120 V	208 V	220 V	230 V	240 V	277 V
0.5	4.2	2.4	2.3	2.2	2.1	1.8

kVA	120 V	208 V	220 V	230 V	240 V	277 V
1	8.3	4.8	4.5	4.3	4.2	3.6
1.5	12.5	7.2	6.8	6.5	6.3	5.4
2	16.7	9.6	9.1	8.7	8.3	7.2
3	25.0	14.4	13.6	13.0	12.5	10.8
5	41.7	24.0	22.7	21.7	20.8	18.1
7.5	62.5	36.1	34.1	32.6	31.3	27.1
10	83.3	48.1	45.5	43.5	41.7	36.1
15	125.0	72.1	68.2	65.2	62.5	54.2
25	208.3	120.2	113.6	108.7	104.2	90.3
37.5	312.5	180.3	170.5	163.0	156.3	135.4
50	416.7	240.4	227.3	217.4	208.3	180.5
75	625.0	360.6	340.9	326.1	312.5	270.8
100	833.3	480.8	454.5	434.8	416.7	361.0
167	1,391.7	802.9	759.1	726.1	695.8	602.9

Three-phase kW to amps at power factor 0.8 (generators)

kW	kVA	208 V	400 V	415 V	480 V	600 V
10	12.5	34.7	18.0	17.4	15.0	12.0
20	25	69.4	36.1	34.8	30.1	24.1
25	31.3	86.7	45.1	43.5	37.6	30.1
30	37.5	104.1	54.1	52.2	45.1	36.1
40	50	138.8	72.2	69.6	60.1	48.1
50	62.5	173.5	90.2	87.0	75.2	60.1
60	75	208.2	108.3	104.3	90.2	72.2
75	93.8	260.2	135.3	130.4	112.8	90.2
80	100	277.6	144.3	139.1	120.3	96.2
100	125	347.0	180.4	173.9	150.4	120.3
125	156.3	433.7	225.5	217.4	187.9	150.4
150	187.5	520.4	270.6	260.9	225.5	180.4
200	250	693.9	360.8	347.8	300.7	240.6
250	312.5	867.4	451.1	434.8	375.9	300.7
300	375	1,040.9	541.3	521.7	451.1	360.8
400	500	1,387.9	721.7	695.6	601.4	481.1
500	625	1,734.8	902.1	869.5	751.8	601.4
600	750	2,081.8	1,082.5	1,043.4	902.1	721.7
750	937.5	2,602.2	1,353.2	1,304.3	1,127.6	902.1
800	1,000	2,775.7	1,443.4	1,391.2	1,202.8	962.3
1,000	1,250	3,469.7	1,804.2	1,739.0	1,503.5	1,202.8
1,500	1,875	5,204.5	2,706.3	2,608.5	2,255.3	1,804.2
2,000	2,500	6,939.3	3,608.4	3,478.0	3,007.0	2,405.6

Three-phase amps to kVA

Amps	kVA at 208 V	kVA at 400 V	kVA at 415 V	kVA at 480 V	kVA at 600 V
10	3.6	6.9	7.2	8.3	10.4
16	5.8	11.1	11.5	13.3	16.6

Amps	kVA at 208 V	kVA at 400 V	kVA at 415 V	kVA at 480 V	kVA at 600 V
20	7.2	13.9	14.4	16.6	20.8
25	9.0	17.3	18.0	20.8	26.0
32	11.5	22.2	23.0	26.6	33.3
40	14.4	27.7	28.8	33.3	41.6
50	18.0	34.6	35.9	41.6	52.0
63	22.7	43.6	45.3	52.4	65.5
80	28.8	55.4	57.5	66.5	83.1
100	36.0	69.3	71.9	83.1	103.9
125	45.0	86.6	89.9	103.9	129.9
160	57.6	110.9	115.0	133.0	166.3
200	72.1	138.6	143.8	166.3	207.8
250	90.1	173.2	179.7	207.8	259.8
400	144.1	277.1	287.5	332.6	415.7
630	227.0	436.5	452.8	523.8	654.7
800	288.2	554.3	575.0	665.1	831.4
1,000	360.3	692.8	718.8	831.4	1,039.2
1,250	450.3	866.0	898.5	1,039.2	1,299.0
1,600	576.4	1,108.5	1,150.1	1,330.2	1,662.8
2,000	720.5	1,385.6	1,437.6	1,662.8	2,078.5
2,500	900.7	1,732.1	1,797.0	2,078.5	2,598.1
3,200	1,152.9	2,217.0	2,300.2	2,660.4	3,325.5
4,000	1,441.1	2,771.3	2,875.2	3,325.5	4,156.9

kW, kVA and kvar at different power factors

For 100 kW of load. Lower power factor means more current for the same real power.

Power factor	kVA for 100 kW	kvar for 100 kW	Amps at 400 V 3-phase	Amps at 480 V 3-phase
0.60	166.7	133.3	240.6	200.5
0.70	142.9	102.0	206.2	171.8
0.75	133.3	88.2	192.5	160.4
0.80	125.0	75.0	180.4	150.4
0.85	117.6	62.0	169.8	141.5
0.90	111.1	48.4	160.4	133.6
0.95	105.3	32.9	151.9	126.6
1.00	100.0	0.0	144.3	120.3

Formulas

Motor full-load currents for conductor and protection sizing come from code tables (NEC 430.248–430.250) or the motor nameplate, not from these formulas.

To find	Single-phase	Three-phase	DC
Amps from kVA	I = kVA × 1000 ÷ V	I = kVA × 1000 ÷ (√3 × V)	—
Amps from kW	I = kW × 1000 ÷ (V × PF)	I = kW × 1000 ÷ (√3 × V × PF)	I = kW × 1000 ÷ V
kVA from amps	kVA = V × I ÷ 1000	kVA = √3 × V × I ÷ 1000	—
kW from amps	kW = V × I × PF ÷ 1000	kW = √3 × V × I × PF ÷ 1000	kW = V × I ÷ 1000
kW from kVA	kW = kVA × PF	kW = kVA × PF	—
Motor input kW	kW = hp × 0.7457 ÷ efficiency	kW = hp × 0.7457 ÷ efficiency	kW = hp × 0.7457 ÷ efficiency

Sources and method

- **IEEE Std 1459** — Definitions of apparent (VA), active (W) and reactive (var) power
- **IEC 60038** — Standard voltages (230/400 V; 120/208 V, 277/480 V and 347/600 V systems in North America)

Every current is calculated from the formulas above. No values are typed in. Interactive version, corrections and more charts: **allunitconversions.com/kva-to-amps-chart**