

UL Sizing Chart (1 Phase)

HP	Volts	Motor Amps	Wire Size (AWG)	Bend Radius* (Inches)	Contactor	Cerus Motor Overload		Manual Motor Starter	Motor Circuit Protector
						Thermal	Electronic		
1/10	120	3.0	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
	230	1.5	12	-	MRC-9	MTK-32/3-1.6	CRP22-3P 5A	CMS-32HI-1.6	CMS-32HI-1.6
1/8	120	3.8	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
	230	1.9	12	-	MRC-9	MTK-32/3-2.5	CRP22-3P 5A	CMS-32HI-2.5	CMS-32HI-2.5
1/6	120	4.4	12	-	MRC-9	MTK-32/3-6	CRP22-3P 5A	CMS-32HI-6	CMS-32HI-6
	230	2.2	12	-	MRC-9	MTK-32/3-2.5	CRP22-3P 5A	CMS-32HI-2.5	CMS-32HI-2.5
1/4	120	5.8	12	-	MRC-9	MTK-32/3-8	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-6
	230	2.9	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
1/3	120	7.2	12	-	MRC-9	MTK-32/3-8	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
	230	3.6	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
1/2	120	9.8	12	-	MRC-12	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-10
	230	4.9	12	-	MRC-9	MTK-32/3-6	CRP22-3S 22A	CMS-32HI-6	CMS-32HI-6
3/4	120	13.8	12	-	MRC-18	MTK-32/3-18	CRP22-3S 22A	CMS-32HI-17	CMS-32HI-17
	230	6.9	12	-	MRC-9	MTK-32/3-8	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
1	120	16.0	12	-	MRC-18	MTK-32/3-18	CRP22-3S 22A	CMS-32HI-17	CMS-32HI-17
	230	8.0	12	-	MRC-9	MTK-32/3-9	CRP22-3S 22A	CMS-32HI-10	CMS-32HI-8
1 1/2	120	20.0	12	-	MRC-25	MTK-32/3-25	CRP22-3S 22A	CMS-32HI-22	CMS-32HI-22
	230	10.0	12	-	MRC-12	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-10
2	120	24.0	10	-	MRC-25	MTK-32/3-25	CRP40-3S 40A	CMS-32HI-26	CMS-32HI-26
	230	12.0	12	-	MRC-18	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-13
3	120	34.0	8	1.5	MRC-40	MTK-63/3-40	CRP40-3S 40A	CMS-63HI-40	CMS-63HI-40
	230	17.0	12	-	MRC-18	MTK-32/3-22	CRP22-3S 22A	CMS-32HI-22	CMS-32HI-17
5	120	56.0	6	2	MRC-63	MTK-63/3-65	CRP80-3S 80A	CMS-63HI-63	CMS-63HI-63
	230	28.0	10	-	MRC-32	MTK-32/3-32	CRP40-3S 40A	CMS-32HI-32	CMS-32HI-32
7 1/2	120	80.0	4	3	MRC-85	MTK-95/3-85	-	CMS-100HI-90	CMS-100HI-90
	230	40.0	8	1.5	MRC-40	MTK-63/3-50	CRP80-3S 80A	CMS-63HI-50	CMS-63HI-40
10	120	100.0	3	3	CRC-100	CTK-100/3-125A	-	-	CMS-100HI-100
	230	50.0	8	1.5	MRC-63	MTK-63/3-65	CRP80-3S 80A	CMS-63HI-63	CMS-63HI-50
15	120	135.0	1/0	5	CRC-150	CTK-150/3-150	-	-	-
	230	68.0	4	2	CRC-75	CTK-85/3-75	CRP80-3S-80A	CMS-100H-75	CMS-100HI-75

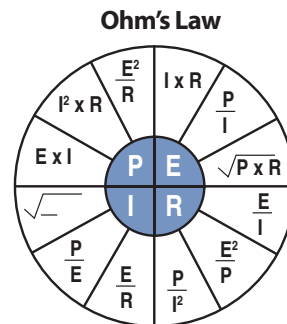
Motor Engineering Formulas

Legend

E = Volts I = Amps W = Watts PF = Power Factor Eff = Efficiency HP = Horsepower 1HP = 746 Watts

AC/DC Formulas

To Find	Single Phase	Three Phase
Amps when HP is known	$\frac{HP \times 746}{E \times Eff}$	$\frac{HP \times 746}{E \times Eff \times PF}$
Amps when kW is known	$\frac{kW \times 1000}{E}$	$\frac{kW \times 1000}{E \times PF}$
Amps when kVA is known	-	$\frac{kVA \times 1000}{E}$
Kilowatts	$\frac{I \times E}{1000}$	$\frac{I \times E \times PF}{1000}$
Kilovolt (Amps)	-	$\frac{I \times E}{1000}$
Horsepower (Output)	$\frac{I \times E \times Eff}{746}$	$\frac{I \times E \times Eff \times PF}{746}$



AC Efficiency & Power Factor Formulas

To Find	Single Phase	Three Phase
Efficiency	$\frac{746 \times HP}{E \times I \times PF}$	$\frac{746 \times HP}{E \times I \times PF \times 1.732}$
Power Factor	$\frac{Input\ Watts}{V \times A}$	$\frac{Input\ Watts}{E \times I \times PF \times 1.732}$

Motor Application Formulas

$$\text{Horsepower} = \frac{\text{Torque (lb-ft)} \times \text{RPM}}{5252}$$

$$\text{Torque (lb-ft)} = \frac{\text{Horsepower} \times 5252}{\text{RPM}}$$

UL Sizing Chart (3 Phase)

HP	Volts	Motor Amps	Wire Size (AWG)	Bend Radius (Inches)	Contactor	Cerus Motor Overload		Manual Motor Starter	Motor Circuit Protector*
						Thermal	Electronic		
1/2	208	2.4	12	-	MRC-9	MTK-32/3-2.5	CRP22-3P 5A	CMS-32HI-2.5	CMS-32HI-2.5
	230	2.2	12	-	MRC-9	MTK-32/3-2.5	CRP22-3P 5A	CMS-32HI-2.5	CMS-32HI-2.5
	480	1.1	12	-	MRC-9	MTK-32/3-1.6	CRP22-3S 1.5A	CMS-32HI-1.6	CMS-32HI-1.6
3/4	208	3.5	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
	230	3.2	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
	480	1.6	12	-	MRC-9	MTK-32/3-1.6	CRP22-3P 5A	CMS-32HI-1.6	CMS-32HI-1.6
1	208	4.6	12	-	MRC-9	MTK-32/3-6	CRP22-3P 5A	CMS-32HI-6	CMS-32HI-6
	230	4.2	12	-	MRC-9	MTK-32/3-6	CRP22-3P 5A	CMS-32HI-6	CMS-32HI-6
	480	2.1	12	-	MRC-9	MTK-32/3-2.5	CRP22-3P 5A	CMS-32HI-2.5	CMS-32HI-2.5
1 1/2	208	6.6	12	-	MRC-9	MTK-32/3-8	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
	230	6.0	12	-	MRC-9	MTK-32/3-8	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
	480	3.0	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
2	208	7.5	12	-	MRC-9	MTK-32/3-9	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
	230	6.8	12	-	MRC-9	MTK-32/3-9	CRP22-3S 22A	CMS-32HI-8	CMS-32HI-8
	480	3.4	12	-	MRC-9	MTK-32/3-4	CRP22-3P 5A	CMS-32HI-4	CMS-32HI-4
3	208	10.5	12	-	MRC-12	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-13
	230	9.6	12	-	MRC-12	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-10
	480	4.8	12	-	MRC-9	MTK-32/3-6	CRP22-3P 5A	CMS-32HI-6	CMS-32HI-6
5	208	16.7	12	-	MRC-18	MTK-32/3-18	CRP22-3S 22A	CMS-32HI-22	CMS-32HI-22
	230	15.2	12	-	MRC-18	MTK-32/3-18	CRP22-3S 22A	CMS-32HI-17	CMS-32HI-17
	480	7.6	12	-	MRC-9	MTK-32/3-9	CRP22-3S 22A	CMS-32HI-10	CMS-32HI-8
7 1/2	208	24.0	10	-	MRC-25	MTK-32/3-25	CRP40-3S 40A	CMS-32HI-26	CMS-32HI-26
	230	22.0	10	-	MRC-25	MTK-32/3-25	CRP40-3S 40A	CMS-32HI-26	CMS-32HI-26
	480	11.0	12	-	MRC-12	MTK-32/3-13	CRP22-3S 22A	CMS-32HI-13	CMS-32HI-13
10	208	31.0	8	1.5	MRC-35	MTK-63/3-36	CRP40-3S 40A	CMS-63HI-40	CMS-63HI-40
	230	28.0	10	1.5	MRC-32	MTK-32/3-32	CRP40-3S 40A	CMS-32HI-32	CMS-32HI-32
	480	14.0	12	-	MRC-18	MTK-32/3-18	CRP22-3S 22A	CMS-63HI-50	CMS-32HI-17
15	208	46.0	8	1.5	MRC-50	MTK-63/3-50	CRP80-3S 80A	CMS-63HI-50	CMS-63HI-50
	230	42.0	8	1.5	MRC-50	MTK-63/3-50	CRP80-3S 80A	CMS-32HI-26	CMS-63HI-50
	480	21.0	10	-	MRC-25	MTK-32/3-25	CRP40-3S 40A	CMS-63HI-63	CMS-32HI-26
20	208	59.0	6	2	MRC-63	MTK-63/3-65	CRP80-3S 80A	CMS-63HI-63	CMS-63HI-63
	230	54.0	6	2	MRC-63	MTK-63/3-65	CRP80-3S 80A	CMS-32HI-32	CMS-63HI-63
	480	27.0	10	-	MRC-32	MTK-32/3-32	CRP40-3S 40A	CMS-100HI-90	CMS-32HI-32
25	208	75.0	4	2	MRC-75	MTK-95/3-85	CRP80-3S 80A	CMS-100HI-75	CMS-100HI-90
	230	68.0	4	2	MRC-75	MTK-95/3-75	CRP80-3S 80A	CMS-63HI-40	CMS-100HI-75
	480	34.0	8	1.5	MRC-35	MTK-63/3-40	CRP40-3S 40A	CMS-100HI-100	CMS-63HI-40
30	208	88.0	3	2.5	MRC-95	MTK-95/3-95	-	CMS-100HI-90	CMS-100HI-100
	230	80.0	4	2	MRC-85	MTK-95/3-85	-	CMS-63HI-50	CMS-100HI-90
	480	40.0	8	1.5	MRC-50	MTK-63/3-50	CRP80-3S 80A	CMS-63S/H-50	CMS-63HI-50
40	208	114.4	2	5	CRC-125	CTK-100/3-125A	-	-	TS250NU ATU 250 250A
	230	104.0	2	3	CRC-125	CTK-100/3-125A	-	-	TS250NU ATU 250 250A
	480	52.0	6	1.5	MRC-63	MTK-63/3-65	CRP80-3S 80A	CMS-63HI-63	CMS-63HI-63
50	208	143.0	1/0	7	CRC-180	CTK-220/3-180A	-	-	TS400NU ATU 400 400A
	230	130.0	1	6	CRC-150	CTK-150/3-150A	-	-	TS400NU ATU 400 300A
	480	65.0	6	2	MRC-75	MTK-95/3-75	CRP80-3S 80A	CMS-100HI-75	CMS-100HI-75
60	208	169.4	2/0	7	CRC-180	CTK-220/3-180A	-	-	TS400NU ATU 400 400A
	230	154.0	2/0	7	CRC-180	CTK-220/3-180A	-	-	TS400NU ATU 400 400A
	480	77.0	4	2	MRC-85	MTK-95/3-85	CRP80-3S 80A	CMS-100HI-90	CMS-100HI-90
75	208	211.2	4/0	10	CRC-300	CTK-400/3-240A	-	-	TS800NU ATU 800 500A
	230	192.0	3/0	8	CRC-220	CTK-220/3-240A	-	-	TS800NU ATU 800 500A
	480	96.0	3	3	CRC-125	CTK-100/3-125A	-	CMS-100HI-100	CMS-100HI-100
100	208	272.8	2 x 1/0	12	CRC-300	CTK-400/3-300A	-	-	TS800NU ATU 800 600A
	230	248.0	2 x 1/0	12	CRC-300	CTK-400/3-300A	-	-	-
	480	124.0	1	6	CRC-150	CTK-150/3-150A	-	-	TS400NU ATU 400 300A
125	208	343.2	2 x 2/0	14	CRC-400	CTK-400/3-400A	-	-	TS800NU ATU 800 800A
	230	312.0	2 x 2/0	14	CRC-400	CTK-400/3-400A	-	-	TS800NU ATU 800 800A
	480	156.0	2/0	7	CRC-180	CTK-220/3-180A	-	-	TS400NU ATU 400 400A
150	208	396.0	2 x 3/0	8*	CRC-600	CTK-600/3-400A	-	-	-
	230	360.0	2 x 3/0	7*	CRC-400	CTK-400/3-400A	-	-	-
	480	180.0	3/0	7	CRC-220	CTK-220/3-240A	-	-	TS400NU ATU 400 400A

* Field wiring requires two conductors

