

Table 1 - Standard nominal system voltages and voltage ranges (Preferred system voltages in bold)

VOLTAGE CLASS	Nominal System Voltage			Nominal Utilization Voltage (Note h)	Voltage Range A (Note b)			Voltage Range B (Note b)		
	(Note a)				Maximum	Minimum		Maximum	Minimum	
	2-wire	3-wire	4-wire		Utilization and Service Voltage (Note c)	Service Voltage	Utilization Voltage	Utilization and Service Voltage	Service Voltage	Utilization Voltage
Low Voltage	Single-Phase Systems									
	120	120/240		115 115/230	126 126/252	114 114/228	108 108/216	127 127/254	110 110/220	104 104/208
	Three-Phase Systems									
			208Y/120 (Note d) 240/120	200 230/115 230	218Y/126 252/126 252	197Y/114 228/114 228	187Y/108 216/108 216	220Y/127 254/127 254	191Y/110 (Note 1) 220/110 220	180Y/104 (Note 1) 208/104 208
	240	480Y/277	460Y/266 460 575	504Y/291 504 630 (Note e)	456Y/263 456 570	432Y/249 432 540	508Y/293 508 635 (Note e)	440Y/254 440 550	416Y/240 416 520	
Medium Voltage		2400	4160Y/2400		2520 4370Y/2520 4370	2340 4050Y/2340 4050	2160 3740Y/2160 3740	2540 4400Y/2540 4400	2280 3950Y/2280 3950	2080 3600Y/2080 3600
		4800			5040 7240	4680 6730	4320 6210	5080 7260	4560 6560	4160 5940
		6900	8320Y/4800 12000Y/6930 12470Y/7200 13200Y/7620 13800Y/7970		8730Y/5040 12600Y/7270 13090Y/7560 13860Y/8000 14490Y/8370 14490	8110Y/4680 11700Y/6760 12160Y/7020 12870Y/7430 13460Y/7770 13460	(Note f)	8800Y/5080 12700Y/7330 13200Y/7620 13970Y/8070 14520Y/8380 14520	7900Y/4560 11400Y/6580 11850Y/6840 12504Y/7240 13110Y/7570 13110	(Note f)
		13800	20780Y/12000 22860Y/13200		21820Y/12600 24000Y/13860 24150	20260Y/11700 22290Y/12870 22430	(Note f)	22000Y/12700 24200Y/13970 24340	19740Y/11400 21720Y/12540 21850	(Note f)
		23000	24940Y/14400 34500Y/19920		26190Y/15120 36230Y/20920 36230	24320Y/14040 33640Y/19420 33640		26400Y/15240 36510Y/21080 36510	23690Y/13680 32780Y/18930 32780	
		34500								
		46000			Maximum Voltage (Note g) 48300	Note 1: Many 220-volt motors were applied on existing 208 volt systems on the assumption that the utilization voltage would not be less than 187 volts. Caution should be exercised in applying the Range B minimum voltages of table 1 to existing 208-volt systems supplying such motors.				
		69000			72500					
High Voltage		115000 138000 161000 230000			121000 145000 169000 242000					
Extra-High Voltage		345000 400000 500000 765000			362000 420000 550000 800000					
Ultra-High Voltage		1100000			1200000					

Table 1 Notes —

- (a) Three-phase three-wire systems are systems in which only the three-phase conductors are carried out from the source for connection of loads. The source may be derived from any type of three-phase transformer connection, grounded or ungrounded. Three-phase four-wire systems are systems in which a grounded neutral conductor is also carried out from the source for connection of loads. Four-wire systems in Table 1 are designated by the phase-to-phase voltage, followed by the letter Y (except for the 240/120-volt delta system), a slant line, and the phase-to-neutral voltage. Single-phase services and loads may be supplied from either single-phase or three-phase systems. The principal transformer connections that are used to supply single-phase and three-phase systems are illustrated in Annex A.
- (b) The voltage ranges in this table are illustrated in Annex B.
- (c) For 120-600-volt nominal systems, voltages in this column are maximum service voltages. Maximum utilization voltages would not be expected to exceed 125 volts for the nominal system voltage of 120, nor appropriate multiples thereof for other nominal system voltages through 600 volts.
- (d) A modification of this three-phase, four-wire system is available as a 120/208Y-volt service for single-phase, three-wire, open-wye applications.
- (e) Certain kinds of control and protective equipment presently available have a maximum voltage limit of 600 volts; the manufacturer or power supplier or both should be consulted to assure proper application.
- (f) Utilization equipment does not generally operate directly at these voltages. For equipment supplied through transformers, refer to limits for nominal system voltage of transformer output.
- (g) For these systems, Range A and Range B limits are not shown because, where they are used as service voltages, the operating voltage level on the user's system is normally adjusted by means of voltage regulators or load tap-changers to suit their requirements.
- (h) Nominal utilization voltages are for low-voltage motors and control.