

AREMA®

Communications and Signals Style Manual

June 2022

Introduction

The C&S Style Manual is intended to be used by the AREMA® Technical Committees when preparing new or revising old Manual Parts for the C&S Manual of Recommended Practices. The Style Manual sets forth guidelines dealing with page layout, font, indentation, figures, footers, headers, and much more. Providing a consistent approach to the Manual Parts' development will provide for a more professional publication. All Manual Parts should be reviewed on a five-year cycle.

All Manual Parts are to be developed in Microsoft MS Word, version 2007 or higher. (Microsoft Office Word 2007 is AREMA® headquarters' standard).

Page Layout

The basic format of a page can be found in Appendix A. This format page contains the necessary setup features and may be copied to be the template for a new Manual Part. Manual Parts are to be developed electronically using MS Word software. All the required style issues can be achieved using MS Word.

- A. Paper size - Should be standard letter size, 8.5 in × 11 in, in a portrait orientation.
- B. Paper weight - Should be standard weight of 20 lb.
- C. Margins
 - Top and Bottom should be 0.5 in from paper edge.
 - Sides should be 1.0 in from paper edge.
 - Headers and Footers will automatically be placed within the correct margins.
- D. Justification - Full justification is to be used on the text (block format).
- E. Title - Title shall follow the recommended descriptions listed in Manual Part 1.0.1
Titles and Descriptions for AREMA® C&S Manual Parts
- F. Paragraphs - No indentation will be used at the beginning of each paragraph.
- G. Indentations - May go to a maximum of six levels. The levels are:
 - Level 1 - Capital alphas, bolded, non-underlined starting with “A”.
 - There is no indentation for level 1.
 - Level 2 - Arabic numerals, non-bolded, non-underlined starting with “1”.

There is one standard Tab indentation.

Level 3 - Lower case alphas, non-bolded, non-underlined starting with "a".

There are two standard Tab indentations.

Level 4 - Arabic numerals in parentheses, non-bolded, non-underlined starting with (1). There are three standard Tab indentations

Level 5 - Lower case alpha in parentheses, non-bolded, non-underlined starting with (a). There are four standard Tab indentations

Level 6 - Lower case Roman numeral, non-bolded, non-underlined starting with (i). There are five standard Tab indentations.

An example of a 6 level indentation is as follows: **A.1.a.(1).(a)(i).**

1. The indentation will be a standard Tab spacing of 5 from the left.
2. There are periods between the first to the fourth level of indentations only.

H. Headers and Footers - Will be per the standard shown in Appendix A. Within the header, odd pages will have the publication year on the left side and the part number on the right side. Even pages will have these entries in reverse. The Technical Committees are not to write in the Header and Footer sections.

I. Font - The font chosen for the body of the Manual Part is Arial. The font size is to be 12 pt. The color is to be black.

A. Bolding - is to be used for the Title and the first level of indentation

B. Underlining - The title after the Level 1 indentation.

C. Capitals - are to be used at the beginning of each sentence and at the beginning of each indented level.

The font chosen for the Headers and Footers is Arial Black. The font size is to be 12 pt. The color is black.

The font chosen within Figures and Tables is preferably a minimum of 8 pt. The color is black.

The font to be used on footnotes is Arial 10 pt., color black. See Appendix A for an example of footnote format and placement.

Figures

Figures may be placed within the Manual Part as deemed appropriate. Figures shall be shown in accordance with the style layout in Appendix B. Each figure shall be numbered and the figure number shall be centered under the corresponding figure and kept on the same page as the figure itself. The word "Figure" will be used to start the number, and the corresponding Manual Part number will be used without any periods followed by a hyphen and then the number "1". In the case of multiple figures within a Manual Part, a

hyphen and then a sequential number beginning at "1" shall be used. The entire figure designation shall be bolded.

Example - for Manual Part 18.1 36 having one figure: **Figure 18136-1.**

Figures shall also have titles using standard sentence structure with each word being capitalized. The title will be bolded and will follow the figure number. There will be a colon and then two spaces placed between the figure number and title. The entire figure number and title will be centered under the figure. If the wording wraps to the next line, it must be kept centered.

Example: **Figure 18136-1: Style Format for Manual Parts**

Tables

Tables shall follow the same format as for figures, numbers and titles except they shall be placed above the table and shall follow the word "Table". Table titles should be kept on the same page as the table itself. Tables shall be shown in accordance with the style layout in Appendix B.

Example: **Table 18136-1: Style Format for Manual Parts**

Cross-references

Cross-referencing of material in other Manual Parts, whether in the C&S manual or the MRE Manual of Railway Engineering, shall use the same format. At the point of reference within the Manual Part, the cross-referenced Manual Part number and title shall be shown.

Example: Manual Part 18.1.36 Style Format for Manual Parts.

For cross-referencing of external publications such as ASTM International, FCC, AASHTO, etc., the same format shall be used, with the addition of a date or revision letter.

Example: ASTM International Standard B164-03(2019) Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire.

No parentheses shall be used with cross-reference titles.

The former American Society for Testing Materials ASTM is now called ASTM International.

In addition:

1. Manual material ownership shall rest with the topic experts. For example, HBDs are C&S responsibility, so C&S would maintain the technical material ownership,

while manual material in the Manual for Railway Engineering would cross-reference the C&S Manual. Similarly, the reverse would hold true for track components, where the C&S Manual material would cross-reference the Manual for Railway Engineering.

2. While it would be more efficient to not duplicate the cross-referenced information in both AREMA Manuals, it is felt that people who do not want to buy both Manuals should not have to because of cross-references. Therefore, the cross-referenced material shall be included in the referencing manual part as well. The cross-referenced material in both manual parts would be designated by a double asterisk (**) at the beginning and end of the reference. (i.e. **..... the referenced material **).
3. Both the referencing and cross-referenced manual parts shall have a footnote included in each, indicating the cross-reference (See example below). A list of cross-references shall be kept by AREMA headquarters to ensure the Publication Review Committee knows where cross-references are so they can be reviewed for accuracy and to ensure they stay current.
4. When a manual part is cross-referenced, the referencing Technical Committee shall advise AREMA headquarters, who in turn will update the cross-referenced list and advise the appropriate Technical Committee for the other Manual of the cross-reference so they can add a footnote to their manual part as well.
5. When a manual part has been revised that affects a cross-referenced section of manual material, the Technical Committee making the change shall advise AREMA headquarters, who will then contact the appropriate Technical Committee for the other Manual, advising them of the change to the cross-referenced material so they can update their manual part accordingly.

The following is an example of both footnotes to be used:

Referenced Material Footnote: "Cross-referenced by Manual for Railway Engineering, Chapter., Part"

Referencing Material Footnote: "Cross-referencing C&S Manual of Recommended Practices, MP"

Footnotes

Footnotes shall be shown above the footer, starting with a number in Arial font size 10 that is in superscript format followed (with no spacing) by a clear and concise text. Footnotes should only be used for additional explanatory comments.

Manual Part Numbering

AREMA[®] headquarters will assign new Manual Parts. Manual part numbers are shown in three sections, each separated by a period. Each section may have up to 2 digits.

Example: 18.1.36

where 18 - represents the Chapter, 1- the Topic, 36 - the Sub-Topic

The topic and sub-topic numbers will be chosen sequentially. No previous numbers will be re-used. AREMA[®] headquarters will maintain an archival list for all manual part numbers for future reference purposes. Where the Manual Part is a figure only, a letter designation shall be used after the three sections. If more than one figure follows, then start at A then sequentially use B, C, etc.

Example: 18.1.36A

Alternate Practices

Where there is more than one common practice in use, a Manual Part may show the prevalent practice first and then list the alternate practices under the Alternate Practices section within the Manual Part.

Section Labeling Convention

Each section of a Manual Part shall have a title with the content beginning two lines below. This rule only applies to the level 1 indentation within each section.

Example:

A. Purpose

The purpose of the style manual is

While the content of each Manual Part will vary, the section labeling should remain as consistent as possible. The following convention should be adhered to as closely as possible.

A. Purpose

B. General

C. .

D. .

E. .

F. .

Should and Shall

The words "should" and "shall" are to be used under the following conditions:

Shall - when the direction given may adversely affect safety if not followed, or when referencing other AREMA Manual Parts.

Should - preference given to the direction, but safety would not be compromised if not followed.

Consistency

There are many words where two or more may be used to provide the same meaning, but the following conventions shall be used:

1. Ensure - is to be used instead of *insure*.
2. Embed - is to be used instead of *imbed*.
3. Enclosure - is to be used instead of *inclosure*.

Appendices

Appendices are not recommended to be used with a Manual Part except when absolutely necessary. The material may either be incorporated within the Manual Part or cross-referenced from the original source.

Metric and Imperial Measures

Both the Metric and Imperial measures are to be shown in the Manual Parts. The Imperial will be shown first with the Metric equivalent shown after in brackets. Exceptions to this rule can be invoked when such information is expressed using customary terms that are widely used and recognized such as common drill sizes, traditional tools, standard fastener sizes, commercial pipe sizes and other similar terms commonly used in the United States. For example, it is permissible to refer to a "36-inch pipeline" or a "half-inch drill" without showing the equivalent metric unit.

Example: 1 inch (25.4 mm)

The Metric may be shown first with the Imperial equivalent shown after in brackets where this is the common industry practice such as in the Cable and Wire industry.

Example: +90 °C (+194 °F)

There are two exceptions to the use of both measures:

1. When the size of a drawing would make it difficult to properly read the dimensions or values.
2. When describing the temperature rise and differential temperatures of electrical apparatus. These are usually expressed only in degrees Celsius or kelvin

The equivalent Metric unit for wire sizes expressed in AWG (American Wire Gauge) is mm². The cross-sectional value found for a given size will be the exact conversion in mm². It will be up to the user to specify the corresponding standard Metric size.

Example: 14 AWG (2.08 mm²). The closest Metric equivalent is 2.5 mm².
 12 AWG (3.31 mm²). The closest Metric equivalent is 4.0 mm².

Abbreviations

The use of abbreviations within the Manual Parts is accepted, as long as the following conventions are applied:

A. Measures: See a complete list under Guidelines for the Use of Symbols and Units Part C.

B. Numbers: Are to be written out when starting a sentence.
 Are to be shown as a numeral within the text.

C. Time and Date: Time to be shown in 24-hour time. Examples:

2245 hours	<i>but not:</i>	10:45 p.m.
1331:52 hours	<i>but not:</i>	1:31:52 p.m.
0916 hours	<i>but not:</i>	9:16 a.m.

Date is to be shown as day, month, year. Example:

18 Dec. 2002	<i>but not:</i>	12/18/02 or Dec 18, 2002
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D. Temperature: To be shown in Fahrenheit with Celsius shown after in brackets. Example: +32 °F (0 °C).
 The Metric may be shown first with the Imperial equivalent shown after in brackets where this is the common industry practice such as in the Cable and Wire industry.
 Example: +90 °C (+194 °F)

Both the plus (+) sign and the minus (–) sign shall be used to describe the temperatures. A space shall be placed between the number and the degree (°) sign.

Trademarks and Copyrights

Trademarks must be denoted with a ® symbol and copyrights with a symbol © after the name with no space in between.

Government Standards

Government standards, such as those of the FRA are not to be referenced, unless they represent the only technical practice in industry, such as FCC part J. on electrical interference.

Hyphenation

Hyphens are usually used between the parts of a compound word (e.g. relay-based), or the syllables of a divided word at the end of a line. They may also be used when listing bullet points.

Quotation Marks, Commas and Periods

Although it defies grammatical logic, commas and periods must be placed inside quotation marks at the end of sentences e.g. *To get to the next line press the button marked “Enter.”* The only exception to this rule occurs if the last word is a single character e.g. *Reference is made to paragraph “C”.* or *Refer to list “1”, but not to “10”.*

Parentheses and Dashes

Periods go inside parentheses only if the entire sentence is inside the parentheses.

Examples: *Please read the analysis (I enclosed it as Attachment A.).*
or
Please read the analysis. (I enclosed it as Attachment A.)
or
Please read the analysis (Attachment A).

Dashes may be used instead of parentheses when emphasis needs to be added. Like exclamation points, dashes should not be overused.

Drawings and Figures

Drawings and figures are to be of electronic format using a CAD software package (unless drawings and figures can be drawn within the MS Word format) and will be placed within the MS text in a compatible picture file format (ex. pdf, jpeg, etc.). Format of the drawings is to follow the C&S standard as directed by AREMA headquarters. Copies of the original

drawings or figures must be appended to the submittal in both their native CAD format and either dxf or dwg formats. Supporting 3D models or assemblies must be supplied in their native CAD format if they were required to generate the drawings or figures.

Manual Part Types

There are various types of manual parts depending on the nature of the subject material. For consistency, the manual part titles should begin with one of the following:

Guidelines for
Applications for
Instructions for....

Language

The Manual Parts are to be written in American English, following all the grammar rules that apply thereto. Technical content should avoid jargon, acronyms, and use of personal pronouns in their manuscripts. Gender neutral terms are required.

Revisions to Manual Parts

Revisions to Manual Parts should be made by using the Review>Track Changes feature of Word whereby all changes are memorialized. In addition, a clean version should be provided in Word for publication.

Guidelines for the Use of Symbols and Units

Because of the increasing need for symbols and units to be able to be recognized internationally, it is suggested that the following SI guidelines be used. The International System of Units (SI) listed by the National Institute of Standards and Technology (NIST) has compiled an extensive guide with the goal of achieving uniformity in technical manuscripts. While the emphasis of the SI is to use metric units it does not preclude the use of units commonly used in the United States such as U.S. standard fastener sizes, commercial pipe sizes, and other common terms. For instance, it is permissible to refer to a “36-inch pipeline” or a “half-inch drill”.

- A. General – For a comprehensive treatise of the use of SI units refer to NIST Special Publication 811 – 2008 Edition: Guide for the Use of the International System of Units (SI) published by the Department of Commerce.
- B. Highlights – The following are but a few general guidelines for reviewing manuscripts:
 - 1. The combination of letters “ppm,” “ppb” and “ppt,” and the terms part per million, part per billion, and part per trillion are not used to express the values of quantities.

The following forms are used instead: 2.0 uL/L or 2.0×10^{-6} V, 4.3 nm/m or 4.3×10^{-9} l, 7 ps/s $\times 10^{-12}$ t, where V, l, and t are, respectively, the quantity symbols for volume, length, and time.

- Unit symbols are not modified by the addition of subscripts or other information. For example:

$$V_{\max} = 1000 \text{ V} \qquad \text{but not: } V = 1000 V_{\max}$$

- Information is not mixed with unit symbols (or names). For example, the form “the water content is 20 mL/kg” is used and not “20 mL H₂O/kg.”
- It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity. Examples:

35 cm \times 48 cm	<i>but not:</i> 35 \times 48 cm
20 °C to 30 °C or (20 to 30) °C	<i>but not:</i> 20 °C – 30 °C or 20 to 30 °C
123 g \pm 2 g or (123 \pm 2) g	<i>but not:</i> 123 \pm 2 g
70 % \pm 5 % or (70 \pm 5) %	<i>but not:</i> 70 \pm 5 %

- Values of quantities are expressed using Arabic numerals and the symbols for the units.

$$m = 5 \text{ kg} \qquad \text{but not: } m = \text{five kilograms or five kg}$$

Although the use of only symbols is preferred, units can be expressed as complete terms such as amperes for “A” or pounds for “lb”.

- There is a space between the numerical value and unit symbol, even when the value is used as an adjective except in the case of superscript units for plane angle.

a 25 kg sphere	<i>but not:</i> a 25-kg sphere
an angle of 2°3'4"	<i>but not:</i> an angle of 2 °3 '4 "
temperature of +43 °F (+6 °C)	<i>but not</i> temperature +43°F(+6°C)

- Commas are used to separate digits to the left side of the decimal point in groups of three. *Note: Because commas are used in other countries to denote the decimal marker, recent standard trends suggest that the digits of numerical values having more than four digits on either side of the decimal marker are separated into groups of three using a thin, fixed space counting from both the left and the right of the decimal marker. For example, 15 739.012 53 is highly preferred to 15739.1253. .*
- Unit symbols are in roman type, and quantity symbols are in italic type with superscripts and subscripts in roman or italic type as appropriate.
- When spelled out in full, unit names are treated like ordinary English nouns. Thus the names of all units start with a lower-case letter, except at the beginning of a sentence or in a capitalized material such as a title. In keeping with this rule, the

correct spelling of the unit °C is “degree Celsius” (the unit “degree” begins with a lowercase “d” and the modifier “Celsius” begins with an uppercase “C” because it is the name of a person).

10. When the name of a unit containing a prefix is spelled out, no space or hyphen is used between prefix and unit name. Example:

milligram *but not:* milli-gram kilopascal *but not:* kilo-pascal

the exception to this rule occurs when a derived unit is formed from other units by multiplication. Example:

pascal second (preferred) or pascal-second are both acceptable.

11. When the name of a derived unit formed from other units by division is spelled out, the word “per” is used and not a solidus. Example:

ampere per meter (A/m) *but not:* ampere/meter

12. Symbols for quantities are italic and for units are roman. Examples:

$t = 3 \text{ s}$ t time, s second $T = 22 \text{ K}$ T temperature, K kelvin
 $r = 11 \text{ cm}$ r radius, cm centimeter $\lambda = 633 \text{ nm}$ λ wavelength, nm nanometer

13. Unit symbols are printed in lower-case letters except that.

- a. The symbol or the first letter of the symbol is an upper-case letter when the name of the unit is derived from the name of a person; and
- b. The recommended symbol for the liter in the United States is L (to avoid confusion with the number “1”). Examples:

m (meter)	s (second)	V (volt)	A (ampere)
Pa (pascal)	lm (lumen)	Wb (weber)	T (tesla)

14. Units are never capitalized except for “American wire gauge” or “British thermal units” or other similar units.

15. Unit symbols are unaltered in the plural. Examples:

$l = 75 \text{ cm}$ *but not:* $l = 75 \text{ cms}$
 $t = 32 \text{ min}$ *but not:* $t = 32 \text{ mins}$

16. Unit symbols are not followed by a period unless at the end of a sentence. Examples:

“Its length is 75 cm.” or “It is 75 cm long.” *but not:* “It is 75 cm. long.”

17. It is not permissible to use abbreviations for units’ symbols or names. Examples:

Sec (for either s or second).
 sq. mm (for either mm² or square millimeter).
 cc (for either cm³ or cubic centimeter).
 mins (for either min or minutes).
 hrs (for either h or hours).
 lit (for either L or liter).
 amps (for either A or amperes).
 AMU (for either u or unified atomic mass unit).
 mps (for either m/s or meter per second).

18. The unit symbol for kelvin is K, *not* °K.

19. The number “0” is always used to the left of the decimal point when this place has no value: Example:

The distance is 0.26 in

but not: The distance is .26 in

20. Equations and scientific notation should utilize the appropriate Unicode symbols for the minus, and multiplication signs (– ×) in lieu of the common keyboard hyphen and letter x characters (- x). As information, the standard keyboard plus sign is Unicode Character (002B)

Unicode Character (2212) for minus:	4 – 2	<i>but not:</i> 4 - 2
	...10 ⁻³	<i>but not:</i> ...10 ⁻³
Unicode Character (00D7) for multiply:	4 × 2	<i>but not:</i> 4 x 2

21. Scientific notation should be used whenever possible. Examples:

1.23 × 10¹¹ = 123,000,000,000

5 × 10⁻⁵ = 0.00005

C. Symbols and units – Following is a list of the most commonly used units, and their symbols:

Abbreviations and Letter Symbols for Units	
Unit or Term	Abbreviation or Symbol
acceleration of gravity	g
alternating current	ac
American wire gauge	AWG
ampere	A
ampere-hour	Ah
ampere per meter	A/m
ampere turn	At
amplitude modulation	AM
antilogarithm	antilog
application development tool	ADT
audio frequency	AF

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
automatic equipment identification	AEI
automatic frequency control	AFC
automatic gain control	AGC
automatic speed control	ASC
automatic train control	ATC
automatic volume control	AVC
average	avg
average rated life	ARL
axial alignment	AA
baud	Bd
beat-frequency oscillator	BFO
binary coded decimal	BCD
bit	b
British thermal unit	Btu
calorie	cal
candela	cd
candela per square foot	cd/ft ²
candela per square meter	cd/m ²
capacitance	C
cathode-ray oscilloscope	CRO
cathode-ray tube	CRT
centimeter	cm
centimeter-gram-second	CGS
checksum or cyclic redundancy check	CRC
circular mil	cmil
color light signal	CLT
color position light signal	CPLT
Commission Internationale de l'Eclairage	CIE
common mode	CM
computer aided application	CAA
configuration management	CM
configuration item	CI
constant warning time	CWT
continuous wave	CW
coulomb	C
counter-electromotive force	CEMF
crossing gate arm	CGA
cubic centimeter	cm ³
cubic foot	ft ³
cubic foot per minute (cfm)	ft ³ /min

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
cubic inch	in ³
cubic meter	m ³
cubic meter per second	m ³ /s
cyclic redundancy check	CRC
decibel	dB
degree Celsius	°C
degree Fahrenheit	°F
degree (plane angle)	...°
degree Rankin	°R
degree (temp. interval or difference)	deg
device under test	DUT
diameter	diam
differential mode	DM
direct current	dc
electromagnetic compatibility	EMC
electromagnetic interference	EMI
electromagnetic unit	EMU
electromotive force	EMF
electronic data processing	EDP
electronvolt	eV
electrostatic unit	ESU
engineering change	EC
engineering change process	ECP
etcetera	etc.
exempli gratia (for example)	e.g.
extra-high voltage	EHV
extremely high frequency	EHF
extremely low frequency	ELF
failure fault trees	FFT
failure modes and defects analysis	FMEA
failure modes, effects and criticality analysis	FMECA
failure tree analysis	FTA
farad	F
fault tree analysis	FTA
field-effect transistor	FET
foot	ft
foot per minute	ft/min
foot per second	ft/s
foot pound-force	ft · lbf
frequency modulation	FM
functional fault trees	FFT
gallon	gal
gallons per minute	gal/min

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
gauge	ga
gauss	G
geographic information system	GIS
gigaelectronvolt	GeV
gigahertz	GHz
gram	g
gravity	g_0 or g_n or g
henry	H
hertz	Hz
high voltage	HV
hour	h
id est (that is)	i.e.
Impedance	Z
inch	in
inch per second	in/s
indicator	IND
individual line replaceable unit mean time to replace	IMTTR
inductance	L
inductance-capacitance	LC
inertia	$\text{kg} \cdot \text{m}^2$ or $\text{lb} \cdot \text{ft}^2$
infrared	IR
inside diameter	ID
integrated circuit	IC
intermediate frequency	IF
International Electrotechnical Commission	IEC
international system of units	SI
input/output	I/O
joule	J
joule per degree	J/deg
kelvin	K
kilocircular mil	kcmil
kiloelectronvolt	keV
kilogauss	kG
kilogram	kg
kilogram per square centimeter	kg/cm^2
kilogram per square meter	kg/m^2
kilohertz	kHz
kilohm	$k\Omega$
kilojoule	kJ
kilometer	km
kilometer per hour	km/h
kilonewton	kN
kilopound per square inch	ksi

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
kilovar	kvar
kilovolt	kV
kilovoltampere	kVA
kilowatt	kW
kilowatthour	kWh
lambert	L
light center length – measured to top of filament	LCL
light-emitting diode	LED
lineal foot per minute (lfm)	ft/min
line replaceable unit	LRU
liter	L
liter per second	L/s
logarithm	log
logarithm, natural	ln
low frequency	LF
lumen	lm
lumen per square foot	lm/ft ²
lumen per square meter	lm/m ²
lumen per watt	lm/W
lumen second	lm · s
lux	lx
magnetohydrodynamics	MHD
magnetomotive force	MMF
major filament	MF
mean time between failures	MTBF
mean time to restore	MTTR
medium frequency	MF
megaelectronvolt	MeV
megahertz	MHz
meganewton	MN
megavolt	MV
megawatt	MW
megohm	MΩ
metal-oxide semiconductor	MOS
metal-oxide varistor	MOV
meter	m
meter per second	m/s
meter-kilogram-second	MKS
microampere	μA
microcoulomb	μC
microfarad	μF
microgram	μg
microhenry	μH
microinch	μin

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
micrometer	μm
micromho	$\mu\Omega^{-1}$
micromillimeter	μmm
microohm	$\mu\Omega$
microsecond	μs
microwatt	μW
mile per hour	mi/h
mile (statute)	mi
milliampere	mA
milligram	mg
millihenry	mH
milliinch (one thousandth of an inch)	mil
milliliter	mL
millimeter	mm
milliohm	m Ω
millisecond	ms
millitesla	mT
millivolt	mV
milliwatt	mW
minute (plane angle)	...'
minute (time)	min
nanofarad	nF
nanometer	nm
nanosecond	ns
nanowatt	Nw
National Institute of Standards & Technology	NIST
neper	Np
newton	N
newton meter	N · m
newton per square meter	N/m ²
number	No.
octave	oct
octave per minute	oct/min
ohm	Ω
open circuit voltage	OCV
operating & support hazard analysis	O&SHA
original equipment manufacturer	OEM
outside diameter	OD
ounce (avoirdupois)	oz
ounce per square foot	oz/ft ²
overall product mean time to restore	OMTTR
pascal	Pa
peak	pk

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
peak-to-peak	ppk
peak inverse voltage	piv
permeability	μ
per unit	pu
phase modulation	PM
pi	π
picoampere	pA
picocoulomb	pC
picofarad	pF
picoseconds	ps
picowatt	pW
position light signal	PLT
positive train control	PTC
pound	lb
poundal	pdl
pound-force	lbf
pound-force foot	lbf · ft
pound-force per square inch	lbf/in ²
pound per square inch	lb/in ² or psi ¹
preliminary hazard analysis	PHA
power factor	PF
polyvinyl chloride	PVC
preliminary hazard list	PHL
printed circuit board	PCB
probability of a failure being unsafe	PFU
product safety requirements	PSR
programmable read-only memory	PROM
project safety engineer	PSE
quasi-peak	QP
radian	rad
radio frequency	RF
radio-frequency interference	RFI
railroad light center visible day/night indicator	RLS
railroad signal visible night indication only	RS
reactance	X
red, green, blue light	RGB
reluctance	H ⁻¹
resistance	R
resistance-capacitance	RC
resistance-inductance-capacitance	RLC

¹ Although the use of abbreviation psi is common, it is not recommended

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
revolution per minute	r/min
revolution per second	r/s
roentgen	R
root-mean-square	rms
saybolt universal second	SUS
second (plane angle)	..."
second (time)	s
secondary filament	SF
semaphore signal	SEM
short wave	SW
siemens	S
signal-to-noise ratio	SNR
silicon controlled rectifier	SCR
spring switch on station track relay	SSOSTR
square foot	ft ²
square inch	in ²
square meter	m ²
square millimeter	mm ²
square yard	yd ²
standing-wave ratio	SWR
steradian	sr
stoke	St
subsystem hazard analysis	SSHA
switch circuit controller	SCC
switch lamp	SL
system hazard analysis	SHA
television interference	TVI
tesla	T
thousand circular mils	kcmil
traffic control system	TCS
transverse electric	TE
transverse electromagnetic	TEM
transverse magnetic	TM
traveling-wave tube	TWT
tuned resonant unit	TRU
ultra-high frequency	UHF
unique check number	UCN
vacuum-tube voltmeter	VTVM
var	var
variable frequency oscillator	VFO
verification & validation	V&V
very high frequency	VHF
vital microprocessor interlocking system	VMIS
volt	V
voltage controlled oscillator	VCO

Abbreviations and Letter Symbols for Units

Unit or Term	Abbreviation or Symbol
voltage standing-wave ratio	VSWR
voltampere	VA
volts per meter	V/m
watt	W
watthour	Wh
watt per steradian	W/sr
watt per steradian square meter	W/(sr · m ²)
wayside interface unit	WIU
weber	Wb
worse case analysis	WCA
yard	yd

Prefixes

yotta	$10^{24} = (10^3)^8$	Y
zetta	$10^{21} = (10^3)^7$	Z
exa	$10^{18} = (10^3)^6$	E
peta	$10^{15} = (10^3)^5$	P
tera	$10^{12} = (10^3)^4$	T
giga	$10^9 = (10^3)^3$	G
mega	$10^6 = (10^3)^2$	M
kilo	$10^3 = (10^3)^1$	k
hecto	10^2	h
deka	10^1	da
deci	10^{-1}	d
centi	10^{-2}	c
milli	$10^{-3} = (10^{-3})^{-1}$	m
micro	$10^{-6} = (10^{-3})^{-2}$	μ
nano	$10^{-9} = (10^{-3})^{-3}$	n
pico	$10^{-12} = (10^{-3})^{-4}$	p
femto	$10^{-15} = (10^{-3})^{-5}$	f
atto	$10^{-18} = (10^{-3})^{-6}$	a
zepto	$10^{-21} = (10^{-3})^{-7}$	z
yocto	$10^{-24} = (10^{-3})^{-8}$	y

Common Chemical Elements

aluminum	Al
argon	Ar
cadmium	Cd
calcium	Ca
carbon	C
chlorine	Cl
copper	Cu

gold	Au
helium	He
hydrogen	H
iron	Fe
lead	Pb
mercury	Hg
neon	Ne
nickel	Ni
nitrogen	N
oxygen	O
selenium	Se
silicon	Si
silver	Ag
sodium	Na
sulphur	S
tin	Sn
tungsten	W
xenon	Xe
zinc	Zn

AWG Wire Sizes and Equivalent Metric Sizes

AWG	mm ²	Nearest Metric* mm ²	MCM	AWG	mm ²	Nearest Metric* mm ²	MCM	AWG	mm ²	Nearest Metric* mm ²	CM
4/0	107	120	212	14	2.08	2.5	4.1	31	0.0404	--	80
3/0	85.0	95	168	15	1.65	--		32	0.0320	0.03	63
2/0	67.4	70	133	16	1.31	1.5	2.6	33	0.0254	--	50
1/0	53.5	--	106	17	1.04	--		34	0.0201	0.02	40
1	42.4	50	84	18	0.823	1.0	1.6	35	0.0160	--	31
2	33.6	35	67	19	0.653	--		36	0.0127	0.015	25
3	26.7	--	53	20	0.518	0.5	1.0	37	0.0100	0.010	20
4	21.2	25	42	21	0.41	0.38	0.8	38	0.00797	0.008	16
5	16.8	--		22	0.326	0.34	0.6	39	0.00632	0.006	12
6	13.3	16	26	23	0.258	--	0.5	40	0.00501	0.005	10
7	10.5	--		24	0.205	0.25	0.4	41	0.00404	0.004	8
8	8.37	10	17	25	0.162	--	0.3	42	0.00320	0.003	6
9	6.63	--		26	0.129	0.14	0.25	43	0.00254	--	5
10	5.26	6	10	27	0.102	--	0.2	44	0.00201	0.002	4
11	4.17	--		28	0.081	0.08	0.16	45	0.00160	--	3
12	3.31	4	6.6	29	0.064	--	0.13	46	0.00125	0.0015	2.5
13	2.62	--		30	0.051	0.05	0.1				

* Metric sizes as defined by IEC 60228

Appendix A

Manual Part Template

Full Title of Manual Part Goes Here
Revised 2020 (3 Pages)

A. Purpose

Section A. will always describe the Purpose of the Manual Part. It typically only needs to be a sentence or two. All paragraphs will be block justified just like this paragraph is.

B. General

Section B. will always be a section for general information about this Manual Part. It also only needs to be a line or two. ¹

C. Topic

1. Topics always start with number 1.
2. This is Section C.2.
 - a. This is the next level after Section C.2.
 - b. This is Section C.2.b.
 - (1) This is the next level after C.2.b.
 - (a) This is the fifth level if it needed in any Manual Part.
 - (i) If a sixth level is needed, this is what it would look like.
3. More information under Topic.

D. Another Topic.

1. This is Section D.1.
2. This is Section D.2.
 - a. This level starts with a. again.

¹ This is what a footnote would look like at the bottom of the page. They would be numbered sequentially.

Appendix B

Figure and Table Placement

Title borders ½ point double line

Table 1111-1: Table Title Goes Here

All entries centered in cell

	TITLE (Use upper case Arial)				
	units (metric equiv) (Use lower case Arial)	Inches (mm)			
CHART OR TABLE GOES HERE WITH THE TITLE <i>ABOVE</i> THE CHART. THE TABLES ARE NUMBERED SEQUENTIALLY.					
		data			
			data		
				data	

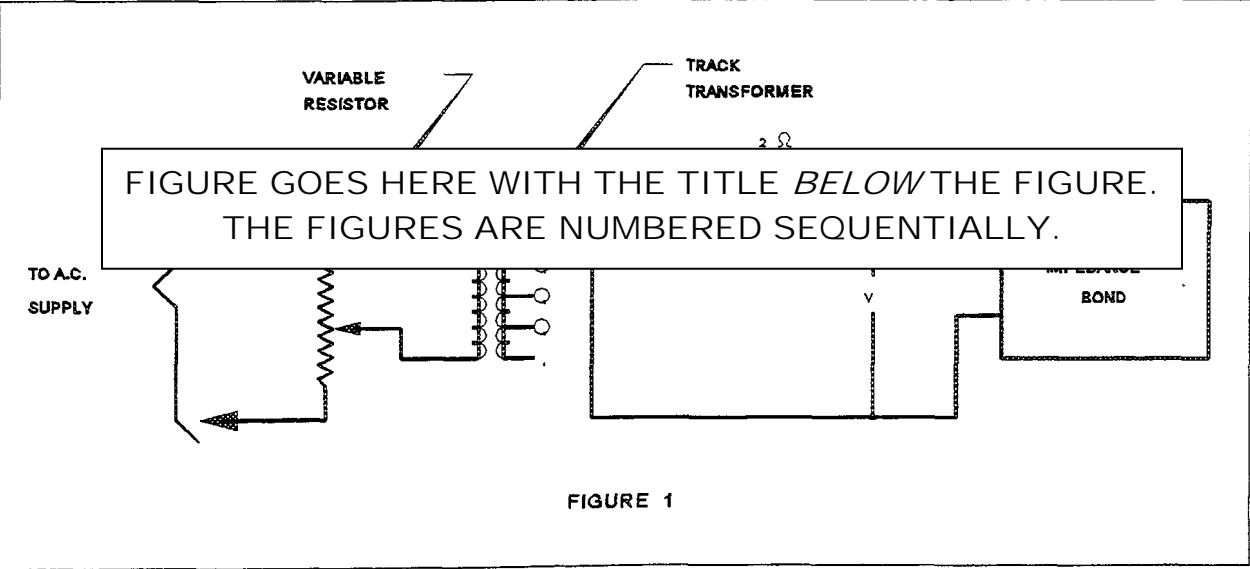


Figure 1111-1: Figure Title Goes Here

Notes:

1. These are the notes about the above Figure.
2. They are numbered sequentially right after the Figure
3. Tables and Figures should be placed as closely as possible to pertinent text.
4. Font for Tables and Figures should be Arial and preferably no smaller than 8. Larger font can be used.