



CiA Draft Recommendation DRP-303-2

Version 1.1

Date: 19. January 2000

© CAN in Automation (CiA)

1 Scope

This document recommends the representation of the International System (SI) of units and prefixes in CANopen Device, Interface and Application Profiles. The name "Système International d'unités" (International System of Units), with abbreviation SI, was adopted by the 11th Conférence générale des poids et mesures in 1960, and is standardized in ISO 1000.

2 Normative references

/1/ ISO 11898: Road vehicles - Interchange of digital information – Controller area network (CAN) for high-speed communication, 1993-11-15

/2/ CiA Draft Standard 301: CANopen communication profile, Version 4.0, 1999-07-01

/3/ ISO 2955: Information processing - Representation of SI and other units in systems with limited character sets, 2nd edition 1983-05-15

/4/ ISO 1000: SI units and recommendations for the use of their multiples and of certain other units, 1983-05-15

3 Abbreviations and definitions

3.1 Abbreviations

- SI – International System of units

3.2 Definitions

Application objects representing physical values shall be described by using objects for prefix, numerator, and denominator. The detailed description is done in CANopen device profiles, interface profiles, and application profiles. The values to be used in these objects are specified in the tables given in chapter 4 and 5.

4 Physical units representation

4.1 Code table for Base SI units

Name of Unit	International Symbol	Notation Index (hex)
none	dimensionless	00
metre	m	01
kilogram	kg	02
second	s	03
ampere	A	04
kelvin	K	05
mole	mol	06
candela	cd	07
reserved	-	08 ... 0F

4.2 Code table for supplementary SI units

Name of Unit	International Symbol	Notation Index (hex)
radian	rad	10
steradin	sr	11
reserved	-	12 ... 1F

4.3 Code table for derived SI units with special names

Name of Unit	International Symbol	Notation Index (hex)
hertz	Hz	20
newton	N	21
pascal	Pa	22
joule	J	23
watt	W	24
coulomb	C	25
volt	V	26
farad	F	27
ohm	Ω	28
siemens	S	29
weber	Wb	2A
tesla	T	2B
henry	H	2C
degree Celsius	$^{\circ}\text{C}$	2D
lumen	lm	2E
lux	lx	2F
becquerel	Bq	30
gray	Gy	31
sievert	Sv	32
reserved	-	33 ... 3F

4.4 Other units from ISO 1000

Name of Unit	International Symbol	Notation Index (hex)
grade (angle)	g(s) [*]	40
degree (angle)	°(s)	41
minute (angle)	'(s)	42
second (angle)	''(s)	43
litre	l [†]	44
are	a	45
hectare	ha	46
minute (time)	min	47
hour	h	48
day	d	49
year	a	4A
gram	g	4B
tonne	t	4C
bar	bar	4E
poise	P	4F
stokes	St	50
electronvolt	eV	51
atomic mass unit	u	52
astronomic unit	AU	53
parsec	pc	54
meter per square second	m/s ²	55
newton metre	Nm	56
square second	s ²	57
square metre	m ²	58
cubic metre	m ³	59
reserved	-	5A ... 9F

4.5 Code table for CANopen Device, Interface and Application Profile-specific units

Name of Unit	International Symbol	Notation Index (hex)
Profile-specific	-	A0 ... FF

^{*} (s) indicates symbol is used in the right superscript position (in the position of an exponent).

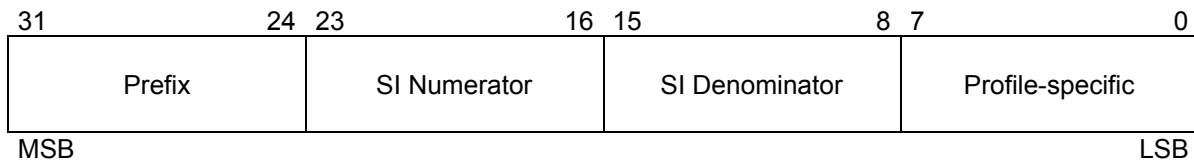
[†] The symbol L can be used as an alternative to the symbol l.

5 Prefix representation

5.1 Code table for prefixes

Prefix	Factor	Symbol	Notation Index
reserved	-	-	13 ... 7F
exa	10^{18}	E	12
-	10^{17}	-	11
-	10^{16}	-	10
peta	10^{15}	P	0F
-	10^{14}	-	0E
-	10^{13}	-	0D
tera	10^{12}	T	0C
-	10^{11}	-	0B
-	10^{10}	-	0A
giga	10^9	G	09
-	10^8	-	08
-	10^7	-	07
mega	10^6	M	06
-	10^5	-	05
-	10^4	-	04
kilo	10^3	k	03
hecto	10^2	h	02
deca	10^1	da	01
-	10^0	-	00
deci	10^{-1}	d	FF
centi	10^{-2}	c	FE
milli	10^{-3}	m	FD
-	10^{-4}	-	FC
-	10^{-5}	-	FB
micro	10^{-6}	μ	FA
-	10^{-7}	-	F9
-	10^{-8}	-	F8
nano	10^{-9}	n	F7
-	10^{-10}	-	F6
-	10^{-11}	-	F5
pico	10^{-12}	p	F4
-	10^{-13}	-	F3
-	10^{-14}	-	F2
femto	10^{-15}	f	F1
-	10^{-16}	-	F0
-	10^{-17}	-	EF
atto	10^{-18}	a	EE
reserved	-	-	ED ... 80

6 Implementation example



OBJECT DESCRIPTION

INDEX	<to be defined in device profile>
Name	<to be defined in device profile>
Object Code	Variable
Data Type	Unsigned32
Category	mandatory or optional

ENTRY DESCRIPTION

Access	rw
PDO Mapping	no or optional
Value Range	<to be defined in device profile>
Default Value	<to be defined in device profile>
Substitute Value	<to be defined in device profile>