

IEC 61131-3 "PLC Programming Languages"

Implementer: OMRON Corporation

Product: Sysmac Studio Ver.1.22

Date: 2018-04-02

The Product compiles with the requirements of the standard for the following language features:

Table No.	Feature No.	Feature name
1	1	Universal coded character set
1	2a	Lower case
1	2b	Number sign #
1	2c	Doller sign \$
2	1	Upper case letters and numbers
2	2	Upper and lower case letters, numbers, embedded underscore
3	1	Single-line comment with //
3	2a	Multi-line comment with (*)
5	1	Integer literal
5	2	Real literal
5	3	Real literal with expornent
5	4	Binary literal
5	5	Octal literal
5	6	Hexadecimal literal
5	7	Boolean zero and one
5	8	Boolean FALSE and TRUE
5	9	Typed literal
6	1a	Empty string (length zero)
6	1b	String of length one or character CHAR containing a single character
6	1c	String of length one or character CHAR containing the "space" character
6	1d	String of length one or character CHAR containing the "single quote" character
6	1e	String of length one or character CHAR containing the "double quote" character
6	1f	Support of two character combinations of Table 7
6	1g	Support of a character representation with '\$' and two hexadecimal characters
6	3a	Typed string
7	1	Dollar sign
7	2	2 Single quote
7	3	3 Line feed
7	4	4 Newline
7	5	5 Form feed (page)
7	6	6 Carriage return
7	7	7 Tabulator
7	8	8 Double quote
8	1a	Duration abbreviations - Day
8	1b	Duration abbreviations - Hour
8	1c	Duration abbreviations - Minute
8	1d	Duration abbreviations - Second
8	1e	Duration abbreviations - Millisecond
8	2a	Duration literals without underscore(short prefix)
8	2b	Duration literals without underscore (long prefix)
8	3a	Duration literals with underscore (short prefix)
8	3b	Duration literals with underscore (long prefix)
9	1a	Date literal (long prefix)
9	1b	Date literal (short prefix)
9	3a	Time of day literal (long prefix)
9	3b	Time of day literal (short prefix)
9	5a	Date and time literal (long prefix)
9	5b	Date and time literal (short prefix)
10	1	BOOL
10	2	SINT
10	3	INT

10	4	DINT
10	5	LINT
10	6	USINT
10	7	UINT
10	8	UDINT
10	9	ULINT
10	10	REAL
10	11	LREAL
10	1a	TIME
10	13a	DATE
10	14a	TIME_OF_DAY, TOD
10	15a	DATE_AND_TME, DT
10	16a	STRING
10	18	BYTE
10	19	WORD
10	20	DWORD
10	21	LWORD
11	1	Enumerated data types
11	5	FB types and classes as array elements
11	6	Structured data type
11	8	Structured data type with relative addressing AT
13	1	Variable with elementary data type
13	2	Variable with user-defined data type
13	3	Variables of array type
14	1	Initialization of a variable with elementary data type
14	2	Initialization of a variable with user-defined data type
14	3	Initialization of a variable with array type
14	4	Declaration and initialization of constants
15	1	Declaration using *
15	2	Standard function LOWER_BOUND and UPPER_BOUND
18	1	Usage without EN and ENO
18	3	Usage of ENO only (without EN)
19	1b	Function with result
19	2a	VAR_INPUT of FUNCTION
19	2b	VAR_OUTPUT of FUNCTION
19	2c	VAR_IN_OUT of FUNCTION
19	2e	VAR of FUNCTION (temporary variable)
19	2f	VAR_EXTERNAL of FUNCTION
19	2g	VAR_EXTERNAL CONSTANT of FUNCTION
19	3a	Initialization of inputs
19	3c	initialization of temporary variables
20	1a	Complete formal call (textual only)
20	1b	Incomplete formal call (textual only)
20	2	Non-formal call (textual only)
20	4	Graphical representation
20	5	Usage of negated boolean input and output in graphical representation
20	6	Graphical usage of VAR_IN_OUT
21	1a	Overloaded function (Standard functions only)
21	1b	Conversion of inputs(Standard functions only)
21	2a	Typed functions
21	2b	Conversion
22	1a	Typed conversion input TO output
	2a	"Old" overloaded truncation TRUNC (Deprecated)
	3a	Typed input BCD TO output
	3b	Overloaded BCD TO output
	4a	Typed input TO BCD output

23	1	LREAL_TO_REAL
23	2	LREAL_TO_LINT
23	3	LREAL_TO_DINT
23	4	LREAL_TO_INT
23	5	LREAL_TO_SINT
23	6	LREAL_TO_ULINT
23	7	LREAL_TO_UDINT
23	8	LREAL_TO_UINT
23	9	LREAL_TO_USINT
23	10	REAL_TO_LREAL
23	11	REAL_TO_LINT
23	12	REAL_TO_DINT
23	13	REAL_TO_INT
23	14	REAL_TO_SINT
23	15	REAL_TO_ULINT
23	16	REAL_TO_UDINT
23	17	REAL_TO_UINT
23	18	REAL_TO_USINT
23	19	LINT_TO_LREAL
23	20	LINT_TO_REAL
23	21	LINT_TO_DINT
23	22	LINT_TO_INT
23	23	LINT_TO_SINT
23	24	LINT_TO_ULINT
23	25	LINT_TO_UDINT
23	26	LINT_TO_UINT
23	27	LINT_TO_USINT
23	28	DINT_TO_LREAL
23	29	DINT_TO_REAL
23	30	DINT_TO_LINT
23	31	DINT_TO_INT
23	32	DINT_TO_SINT
23	33	DINT_TO_ULINT
23	34	DINT_TO_UDINT
23	35	DINT_TO_UINT
23	36	DINT_TO_USINT
23	37	INT_TO_LREAL
23	38	INT_TO_REAL
23	39	INT_TO_LINT
23	40	INT_TO_DINT
23	41	INT_TO_SINT
23	42	INT_TO_ULINT
23	43	INT_TO_UDINT
23	44	INT_TO_UINT
23	45	INT_TO_USINT
23	46	SINT_TO_LREAL
23	47	SINT_TO_REAL
23	48	SINT_TO_LINT
23	49	SINT_TO_DINT
23	50	SINT_TO_INT
23	51	SINT_TO_ULINT
23	52	SINT_TO_UDINT
23	53	SINT_TO_UINT
23	54	SINT_TO_USINT
23	55	ULINT_TO_LREAL
23	56	ULINT_TO_REAL
23	57	ULINT_TO_LINT
23	58	ULINT_TO_DINT
23	59	ULINT_TO_INT

23	60	ULINT_TO_SINT
23	61	ULINT_TO_UDINT
23	62	ULINT_TO_UINT
23	63	ULINT_TO_USINT
23	64	UDINT_TO_LREAL
23	65	UDINT_TO_REAL
23	66	UDINT_TO_LINT
23	67	UDINT_TO_DINT
23	68	UDINT_TO_INT
23	69	UDINT_TO_SINT
23	70	UDINT_TO_ULINT
23	71	UDINT_TO_UINT
23	72	UDINT_TO_USINT
23	73	UINT_TO_LREAL
23	74	UINT_TO_REAL
23	75	UINT_TO_LINT
23	76	UINT_TO_DINT
23	77	UINT_TO_INT
23	78	UINT_TO_SINT
23	79	UINT_TO_ULINT
23	80	UINT_TO_UDINT
23	81	UINT_TO_USINT
23	82	USINT_TO_LREAL
23	83	USINT_TO_REAL
23	84	USINT_TO_LINT
23	85	USINT_TO_DINT
23	86	USINT_TO_INT
23	87	USINT_TO_SINT
23	88	USINT_TO_ULINT
23	89	USINT_TO_UDINT
23	90	USINT_TO_UINT
24	1	LWORD_TO_DWORD
24	2	LWORD_TO_WORD
24	3	LWORD_TO_BYTE
24	5	DWORD_TO_LWORD
24	6	DWORD_TO_WORD
24	7	DWORD_TO_BYTE
24	9	WORD_TO_LWORD
24	10	WORD_TO_DWORD
24	11	WORD_TO_BYTE
24	13	BYTE_TO_LWORD
24	14	BYTE_TO_DWORD
24	15	BYTE_TO_WORD
25	1	LWORD_TO_LREAL
25	2	DWORD_TO_REAL
25	3	LWORD_TO_LINT
25	4	LWORD_TO_DINT
25	5	LWORD_TO_INT
25	6	LWORD_TO_SINT
25	7	LWORD_TO_ULINT
25	8	LWORD_TO_UDINT
25	9	LWORD_TO_UINT
25	10	LWORD_TO_USINT
25	11	DWORD_TO_LINT
25	12	DWORD_TO_DINT
25	13	DWORD_TO_INT
25	14	DWORD_TO_SINT
25	15	DWORD_TO_ULINT
25	16	DWORD_TO_UDINT

25	17	DWORD_TO_UINT
25	18	DWORD_TO_USINT
25	19	WORD_TO_LINT
25	20	WORD_TO_DINT
25	21	WORD_TO_INT
25	22	WORD_TO_SINT
25	23	WORD_TO_ULINT
25	24	WORD_TO_UDINT
25	25	WORD_TO_UINT
25	26	WORD_TO_USINT
25	27	BYTE_TO_LINT
25	28	BYTE_TO_DINT
25	29	BYTE_TO_INT
25	30	BYTE_TO_SINT
25	31	BYTE_TO_ULINT
25	32	BYTE_TO_UDINT
25	33	BYTE_TO_UINT
25	34	BYTE_TO_USINT
25	43	LREAL_TO_LWORD
25	44	REAL_TO_DWORD
25	45	LINT_TO_LWORD
25	46	LINT_TO_DWORD
25	47	LINT_TO_WORD
25	48	LINT_TO_BYTE
25	49	DINT_TO_LWORD
25	50	DINT_TO_DWORD
25	51	DINT_TO_WORD
25	52	DINT_TO_BYTE
25	53	INT_TO_LWORD
25	54	INT_TO_DWORD
25	55	INT_TO_WORD
25	56	INT_TO_BYTE
25	57	SINT_TO_LWORD
25	58	SINT_TO_DWORD
25	59	SINT_TO_WORD
25	60	SINT_TO_BYTE
25	61	ULINT_TO_LWORD
25	62	ULINT_TO_DWORD
25	63	ULINT_TO_WORD
25	64	ULINT_TO_BYTE
25	65	UDINT_TO_LWORD
25	66	UDINT_TO_DWORD
25	67	UDINT_TO_WORD
25	68	UDINT_TO_BYTE
25	69	UINT_TO_LWORD
25	70	UINT_TO_DWORD
25	71	UINT_TO_WORD
25	72	UINT_TO_BYTE
25	73	USINT_TO_LWORD
25	74	USINT_TO_DWORD
25	75	USINT_TO_WORD
25	76	USINT_TO_BYTE
26	8	DT_TO_DATE
26	10	DT_TO_TOD
28	1	ABS(x), x : ANY_NUM
28	2	SQRT(X), X: ANY_REAL
28	3	LN(X), X: ANY_REAL
28	4	LOG(X), X: ANY_REAL
28	5	EXP(X), X: ANY_REAL

28	6	SIN(X), X: ANY_REAL
28	7	COS(X), X: ANY_REAL
28	8	TAN(X), X: ANY_REAL
28	9	ASIN(X), X: ANY_REAL
28	10	ACOS(X), X: ANY_REAL
28	11	ATAN(X), X: ANY_REAL
29	1	ADD +
29	2	MUL *
29	3	SUB -
29	4	DIV /
29	5	MOD
29	6	EXPT **
29	7	Move :=
30	1	SHL
30	2	SHR
30	3	ROR
30	4	ROL
31	1	AND &
31	2	OR
31	3	XOR
31	4	NOT
32	1	MOVE :=
32	2	SEL
32	3	MAX
32	4	MIN
32	5	LIMIT
32	6	MUX
33	1	GT >
33	2	GE >=
33	3	EQ =
33	4	LE <=
33	5	LT <
33	6	NE <>
34	1	LEN
34	2	LEFT
34	3	RIGHT
34	4	MID
34	5	CONCAT
34	6	INSERT
34	7	DELETE
34	8	REPLACE
34	9	FIND
35	1b	ADD_TIME +
35	2b	ADD_TOD_TIME
35	3b	ADD_DT_TIME
35	4b	SUB_TIME
35	5b	SUB_DATE_DATE
35	6b	SUB_TOD_TIME
35	7b	SUB_TOD_TOD
35	8b	SUB_DT_TIME
35	9b	SUB_DT_DT
35	10b	MUL_TIME
35	11b	DIV_TIME
36	1a	CONCAT_DATE_TOD
38	3	EQ =
38	4	NE <>
40	1	Declaration of function block type
40	2a	Declaration of inputs of FB
40	2b	Declaration of outputs of FB

40	2c	Declaration of in-outs of FB
40	2e	Declaration of static variables
40	2f	Declaration of external variables
40	2g	Declaration of external variables with CONSTANT
40	3a	Initialization of inputs
40	3c	Initialization of static variables
40	4a	Declaration of RETAIN qualifier on input variables
40	4b	Declaration of RETAIN qualifier on output variables
40	4e	Declaration of RETAIN qualifier on static variables
40	7a	Graphical declaration of rising edge inputs (>)
40	7b	Graphical declaration of falling edge inputs (<)
41	1	Declaration of FB instances
42	1	Complete formal call (textual only) Is used if EN/ENO is necessary in calls.
42	2	Incomplete formal call (textual only)
42	3	Graphical call
42	4	Graphical call with negated boolean input and output
42	5a	Graphical call with usage of VAR_IN_OUT
42	6a	Textual call with separate assignment of input
42	6b	Graphical call with separate assignment of input
42	7	Textual output read after FB call
42	8a	Textual output assigned in FB call
42	8b	Textual output assigned in FB call with negation
43	1b	Bistable function block (set dominant) with long input names: SR(SET1, RESET, Q1)
43	2a	Bistable function block (reset dominant): RS(S, R1, Q1)
43	2b	Bistable function block (reset dominant) with long input names: RS(SET,RESET1, Q1)
44	1	Rising edge detector: R_TRIG(CLK, Q)
44	2	Falling edge detector: F_TRIG(CLK, Q)
45	1a	CTU_INT(CU, R, PV, Q, CV) or CTU(..)
45	1b	CTU_DINT PV, CV: DINT
45	1c	CTU_LINT PV, CV: LINT
45	1d	CTU_UDINT PV, CV: UDINT
45	1e	CTU_ULINT(CD, LD, PV, CV) PV, CV: ULINT
45	2a	CTD_INT(CD, LD, PV, Q, CV) or CTD
45	2b	CTD_DINT PV, CV: DINT
45	2c	CTD_LINT PV, CV: LINT
45	2d	CTD_UDINT PV, CV: UDINT
45	2e	CTD_ULINT PV, CV: UDINT
45	3a	CTUD_INT(CD, LD, PV, Q, CV) or CTUD(..)
45	3b	CTUD_DINT PV, CV: DINT
45	3c	CTUD_LINT PV, CV: LINT
45	3d	CTUD_UDINT PV, CV: UDINT
45	3d	CTUD_ULINT PV, CV: ULINT
46	1a	TP
46	2a	TON
46	3a	TOF
47	1	Declaration of a program
47	2e	Declaration of static variables of a program
47	2f	Declaration of external variables of a program
47	2g	Declaration of external variables with CONSTANT of a program
47	3c	Initialization of static variables of a program
47	4e	Declaration of RETAIN qualifier on static variables
62	5a	Periodic TASK
62	5b	Non-periodic Task
62	6a	WITH for PROGRAM to TASK assosiation
63	5b	Preemptive scheduling
64	1a	Public namespace (without access specifier)

66	3	USING in POU's - Functions - Function block types - Classes - Methods - Interfaces
71	1	Parentheses (expression)
71	2	Evaluation of result of function and method – if a result is declared Identifier (parameter list)
71	4	Negation -
71	5	Unary Plus +
71	6	Complement NOT
71	7	Exponentiation **
71	8	Multiply *
71	9	Divide /
71	10	Modulo MOD
71	11	Add +
71	12	Subtract -
71	13	Comparison < , > , <= , >=
71	14	Equality =
71	15	Inequality <>
71	16a	Boolean AND &
71	16b	Boolean AND AND
71	17	Boolean Exclusive OR XOR
71	18	Boolean OR OR
72	1a	Assignment of variable and expression of elementary data type
72	1b	Assignment of variables and expression of different elementary data types with implicit type conversion
72	1c	Assignment of variable and expression of user-defined type
72	2a	Function call
72	2b	Function block call and FB output usage
72	3	RETURN
72	4	IF ... THEN ... ELSIF ... THEN ... ELSE ...END_IF
72	5	CASE ... OF ... ELSE ... END_CASE
72	6	FOR ... TO ... BY ... DO ... END_FOR
72	7	WHILE ... DO ... END_WHILE
72	8	REPEAT ... UNTIL ... END_REPEAT
72	10	EXIT an iteration
72	11	Empty statement
73	1b	Unconditional jump in LD
73	2b	Conditional jump in LD
74	1	Left power rail (with attached horizontal link)

74	2	Right power rail (with attached horizontal link)
74	3	Horizontal link
74	4	Vertical link (with attached horizontal links)
75	1	Normally open contact
75	2	Normally closed contact
75	3	Positive transition-sensing contact
75	4	Negative transition-sensing contact
76	1	Momentary coil
76	2	Momentary negated coil
76	3	Set (latch) coil
76	4	Reset (unlatch) coil
76	5	Positive transition-sensing coil
76	6	Negative transition-sensing coil