

# COMPLIANCE LIST MULTIPROG® 3.3 AND PROCONOS® 3.3

(NOVEMBER 2003)



Feature	Compliance
2.1.1 Table 1 Character set	
1 Windows character set	✓
2 Lower case characters	✓
3a Number sign (#)	✓
4a Dollar sign (\$)	✓
5a Vertical bar ( )	✓
6a left and right brackets "[ ]"	✓
2.1.2 Table 2 Identifier features	
1 Upper case and numbers	✓
2 Upper and lower case, numbers, embedded underlines	✓
3 Upper and lower case, numbers, leading or embedded underlines	✓
2.1.5 Table 3 Comments	✓
2.2.1 Table 4 Numeric literals	
1 Integer literals	✓
2 Real literals	✓
3 Real literals with exponents	✓
4 Base 2 literals	✓
5 Base 8 literals	✓
6 Base 16 literals	✓
8 Boolean FALSE and TRUE	✓
2.2.2 Table 5 Character string literal features Feature 1	✓
2.2.3.1 Table 7 Duration literal features	
1a Short prefix without underlines	✓
1b Long prefix without underlines	✓
2a Short prefix with underlines	✓
2b Long prefix with underlines	✓
2.3.1 Table 10 Elementary data types	
1 BOOL	✓
2 SINT	✓
3 INT	✓
4 DINT	✓
6 USINT	✓
7 UINT	✓
8 UDINT	✓
10 REAL	✓
12 TIME	✓
16 STRING	✓
17 BYTE	✓
18 WORD	✓
19 DWORD	✓
2.3.3.2 Table 12 Data type declaration feature	
4 Array data types	✓
5 Structured data types	✓
2.3.3.2 Table 13 Default initial values	
- Target dependent	✓

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Feature	Compliance
2.4.1.1 Table 15 Directly represented variables	
1 Input location	✓
2 Output location	✓
3 Memory location	✓
4 Single bit size (Prefix X)	✓
5 Single bit size (Prefix None)	✓
6 Byte (8 bits) size	✓
7 Word Size	✓
8 Double word (32 bits) size	✓
2.4.3 Table 16 Variable declaration keywords	
VAR	✓
VAR_INPUT	✓
VAR_OUTPUT	✓
VAR_IN_OUT	✓
VAR_EXTERNAL	✓
VAR_GLOBAL	✓
AT	✓
RETAIN	✓
2.4.3.1 Table 17 Variable type assignment features (-> Table 39)	
1 Declaration of directly represented, non-retentive variables	✓
2 Declaration of directly represented, retentive variables	✓
3 Declaration of locations of symbolic variables	✓
4 Array location assignment (by own data type declaration) <sup>1</sup>	✓
5 Automatic memory allocation of symbolic variables	✓
6 Array Declaration	✓
7 Retentive array declaration (arrays as derived data Type)	✓
8 Declaration of structured variables	✓
2.4.3.2 Table 18 Variable initial value assignment features (-> Table 39)	
1 Initialization of directly represented, non retentive variables	✓
2 Initialization of directly represented retentive variables	✓
3 Location and initial value assignment to symbolic variables	✓
4 Array location assignment and initialization (by own data type declaration) <sup>1</sup>	--
5 Initialization of symbolic variables	✓
6 Array initialization (by own data type declaration)	--
7 Retentive array declaration and initialization <sup>1</sup> (by own data type declaration)	--
2.5.1.1 Table 19 Graphical negation of Boolean signals	
1 Negated input	✓
2 Negated output	✓
2.5.1.2 Table 20 Use of EN input and ENO output	
1 Required for LD (corresponding to changed IEC 1131-3)	--
2 Optional for FBD	✓
3 FBD without "EN" and "ENO"	✓
2.5.1.4 Table 21 Typed and overloaded functions	
1 Overloaded functions	✓
2 Typed functions	✓

<sup>1</sup> Array location assignment not possible in variable worksheet. First the array need to be defined in data type worksheets. The assignment of direct addresses can be done later in the variable worksheet.

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Feature	Compliance
2.5.1.5.1 Table 22 Type conversion function features	
1 * _TO_*	✓
2 TRUNC	✓
3 BCD_TO_*	✓
4 * _TO_BCD	✓
2.5.1.5.2 Table 23 Standard functions of one numeric variable	
1 ABS	✓
2 SQRT	✓
3 LN	✓
4 LOG	✓
5 EXP	✓
6 SIN	✓
7 COS	✓
8 TAN	✓
9 ASIN	✓
10 ACOS	✓
11 ATAN	✓
2.5.1.5.2 Table 24 Standard arithmetic functions	
12 ADD	✓
13 MUL	✓
14 SUB	✓
15 DIV	✓
16 MOD	✓
17 EXPT	✓
18 MOVE	✓
2.5.1.5.3 Table 25 Standard bit-shift functions	
1 SHL	✓
2 SHR	✓
3 ROR	✓
4 ROL	✓
2.5.1.5.4 Table 26 Standard bit wise Boolean functions	
5 AND	✓
6 OR	✓
7 XOR	✓
8 NOT	✓
2.5.1.5.4 Table 27 Standard selection functions (typed, non extensible)	
1 SEL	✓
2a MAX	✓
2b MIN	✓
3 LIMIT	✓
2.5.1.5.4 Table 28 Standard comparison functions (non extensible, typed for data type STRING)	
5 GT	✓
6 GE	✓
7 EQ	✓
8 LE	✓
9 LT	✓
10 NE	✓

Feature	Compliance
2.5.1.5.5 Table 29 Standard character string functions	
1 LEN	✓
2 LEFT	✓
3 RIGHT	✓
4 MID	✓
5 CONCAT	✓
6 INSERT	✓
7 DELETE	✓
8 REPLACE	✓
9 FIND	✓
2.5.1.5.7 Table 30 Functions of time data type	
1 ADD (TIME, ...)	✓
4 SUB (TIME, ...)	✓
10 MUL (TIME, ...)	✓
11 DIV (TIME, ...)	✓
2.5.2.2 Table 33 Function block declaration features (-> Table 39)	
1 RETAIN qualifier on internal variables	✓
2 RETAIN qualifier on output variables	✓
4a Input/output declaration (textual)	✓
2.5.2.3.1 Table 34 Standard bistable function blocks	
1 SR	✓
2 RS	✓
2.5.2.3.2 Table 35 Standard edge detection function blocks	
1 R_TRIG	✓
2 F_TRIG	✓
2.5.2.3.3 Table 36 Standard counter function blocks	
1 CTU	✓
2 CTD	✓
3 CTUD	✓
2.5.2.3.4 Table 37 Standard timer function blocks	
1 TP	✓
2a TON	✓
3a TOF	✓
2.5.3 Table 39 Program declaration features	
1 RETAIN qualifier on internal variables	✓
11 Declaration of directly represented, non-retentive variables	✓
12 Declaration of directly represented retentive variables	✓
13 Declaration of locations of symbolic variables	✓
14 Array location assignment (by own data type declaration) <sup>2</sup>	✓
15 Initialization of directly represented, non retentive variables	✓
16 Initialization of directly represented retentive variables	✓
17 Location and initial value assignment to symbolic variables	✓
19 Use of directly represented variables	✓

<sup>2</sup> Array location assignment not possible in variable worksheet. First the array need to be defined in data type worksheets. The assignment of direct addresses can be done later in the variable worksheet.

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Feature	Compliance
2.6.2 Table 40 Step features	
1 Step, initial step (graphical form)	✓
3a, 3b Step flag	✓
2.6.3 Table 41 Transitions and transition conditions	
2 Transition condition using LD language	✓
3 Transition condition using FBD language	✓
4,4a,4b Use of connector	✓
7 Use of transition name	✓
7a Transition condition using LD	✓
7b Transition condition using FBD	✓
7c Transition condition using IL	✓
7d Transition condition using ST	✓
2.6.4.1 Table 42 Declaration of actions	
1 Any boolean variable can be an action	✓
2l Graphical declaration in LD language	✓
2f Graphical declaration in FBD language	✓
3s Textual declaration in ST language	✓
3i Textual declaration in IL language	✓
2.6.4.2 Table 43 Step/action association	
1 Action block	✓
2 Concatenated action blocks	✓
2.6.4.3 Table 44 Action block	
1 Qualifier	✓
2 Action name	✓
2.6.4.4 Table 45 Action qualifiers	
2 Non-stored	✓
3 Overriding Reset	✓
4 Set (Stored)	✓
5 Time limited	✓
6 Time delayed	✓
7 Pulse	✓
8 Stored and time delayed	✓
9 Delayed and stored	✓
10 Stored and time limited	✓
2.6.5 Table 46 Sequence evolution	
1 Single sequence	✓
2a Divergence of sequence selection	✓
3 Convergence of sequence selection	✓
4 Simultaneous sequences	✓
5a Sequence skip	✓
6a Sequence loop	✓
7 Directional arrows	✓

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Feature	Compliance
2.7.1 Table 49 Configuration and resource declaration features	
1 CONFIGURATION	✓
3 RESOURCE	✓
4 VAR_GLOBAL within RESOURCE	✓
5a Periodic TASK	✓
5b Non-periodic TASK	✓
6a PROGRAM with PROGRAM-to-TASK association	✓
6c PROGRAM with no TASK association (by DEFAULT task)	✓
7 Declaration of directly represented variables	✓
2.7.2 Table 50 Task features	
1a Textual declaration of periodic TASK (by project tree)	✓
1b Textual declaration of non-periodic TASK (by project tree)	✓
3a Textual association with PROGRAMs (by project tree)	✓
5b Non-preemptive scheduling (Target dependent)	✓
3.2.2 Table 52 Instruction list (IL) operators	
1 LD	✓
2 ST	✓
3 S, R	✓
4 AND	✓
6 OR	✓
7 XOR	✓
8 ADD	✓
9 SUB	✓
10 MUL	✓
11 DIV	✓
12 GT	✓
13 GE	✓
14 EQ	✓
15 NE	✓
16 LE	✓
17 LT	✓
18 JMP	✓
19 CAL	✓
20 RET	✓
21 )	✓
3.2.3 Table 53 Function block invocation features for IL language	
2 CAL with load/store of inputs	✓

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Feature	Compliance
3.3.1 Table 55 Operators on the ST language	
1 Parenthesization	✓
2 Function evaluation	✓
3 Exponentiation	✓
4 Negation	✓
5 Complement	✓
6 Multiply	✓
7 Divide	✓
8 Modulo	✓
9 Add	✓
10 Subtract	✓
11 Comparison	✓
12 Equality	✓
13 Inequality	✓
14 Boolean AND (&)	✓
15 Boolean AND	✓
16 Boolean exclusive OR	✓
17 Boolean OR	✓
3.3.2 Table 56 ST language statements	
1 Assignment	✓
2 FB invocation and FB output usage	✓
3 RETURN	✓
4 IF	✓
5 CASE	✓
6 FOR (only upwards)	✓
7 WHILE	✓
8 REPEAT	✓
9 EXIT	✓
10 Empty statement	✓
4.1.3 Table 57 Representation of line and block	
2 Horizontal lines	✓
4 Vertical lines	✓
6 Horizontal/vertical connection (with connection dot)	✓
8 Line crossings without connection (without gap)	✓
10 Connected and non connected corners	✓
12 Blocks with connecting lines	✓
14 Graphic connectors	✓
4.1.3 Figure 23 Feedback path	
a Explicit loop	✓
b Implicit loop	✓
c LD language equivalent	✓

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Feature	Compliance
4.1.4 Table 58 Graphic execution control elements	
1 Unconditional jump FBD	✓
2 Unconditional jump LD	✓
3 Conditional jump FBD	✓
4 Conditional jump LD	✓
5 Conditional return LD	✓
6 Conditional return FBD	✓
8 Unconditional Return LD	✓
4.2.1 Table 59 Power rails	
1 Left power rail	✓
2 Right power rail	✓
4.2.2 Table 60 Link elements	
1 Horizontal link	✓
2 Vertical link	✓
4.2.3 Table 61 Contacts	
1 Normally open contact	✓
3 Normally closed contact	✓
4.2.4 Table 62 Coils	
1 Coil	✓
2 Negated coil	✓
3 SET (latch) coil	✓
4 RESET (unlatch) coil	✓
IEC 1131 Extensions	
2 TR2: constant type specifier e.g. INT#12, BOOL#1	✓

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