

SIMATIC C7-633/P, COMPACT UNIT WITH INTEGRATED  
COMPONENTS: S7-300 CPU 315, OP7, IM360 16DI, 16DO, 4AI,  
4AO, 4 UI

Operator control and monitoring	
Password protection	Yes
Password levels	9
Graphics object	
<ul style="list-style-type: none"> <li>Character graphics</li> </ul>	Yes; As part of the character set
Process images	
<ul style="list-style-type: none"> <li>Number of process images</li> </ul>	99
<ul style="list-style-type: none"> <li>Number of variables in message text, max.</li> </ul>	8
<ul style="list-style-type: none"> <li>Entries per process image</li> </ul>	99
Operating-/fault messages	
<ul style="list-style-type: none"> <li>Number of operating messages, max.</li> </ul>	499
<ul style="list-style-type: none"> <li>Scroll operating messages, max.</li> </ul>	256
<ul style="list-style-type: none"> <li>Number of entries in operational log, max.</li> </ul>	256
<ul style="list-style-type: none"> <li>Number of fault message, max.</li> </ul>	499
<ul style="list-style-type: none"> <li>Number of entries in fault message buffer, max.</li> </ul>	256
<ul style="list-style-type: none"> <li>Number of symbol/character sets</li> </ul>	1
Recipes	
<ul style="list-style-type: none"> <li>Number of recipes, max.</li> </ul>	99
<ul style="list-style-type: none"> <li>Data records per recipe, max.</li> </ul>	99
<ul style="list-style-type: none"> <li>Entries per data record, max.</li> </ul>	99
<ul style="list-style-type: none"> <li>Recipe data memory, max.</li> </ul>	4 kbyte
Display	
Design of display	LCD backlit
dynamic objects	Input, output, input/output fields, date/time fields, symbolic input/output fields
Line display	
<ul style="list-style-type: none"> <li>Number of lines</li> </ul>	4
<ul style="list-style-type: none"> <li>Number of characters per line</li> </ul>	20
<ul style="list-style-type: none"> <li>Character size</li> </ul>	8 mm
Backlighting	
<ul style="list-style-type: none"> <li>MTBF backlighting (at 25 °C)</li> </ul>	100 000 h; about 11 years
Control elements	
Keyboard fonts	
<ul style="list-style-type: none"> <li>Function keys</li> </ul>	

— Number of function keys	16
— Number of softkeys	4

### Supply voltage

Rated value (DC)	
<ul style="list-style-type: none"> <li>• 24 V DC</li> </ul>	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	30.2 V
<b>Load voltage L+</b>	
<ul style="list-style-type: none"> <li>• Rated value (DC)</li> </ul>	24 V
<ul style="list-style-type: none"> <li>• permissible range, lower limit (DC)</li> </ul>	20.4 V
<ul style="list-style-type: none"> <li>• permissible range, upper limit (DC)</li> </ul>	28.8 V

### Input current

Current consumption, typ.	550 mA
Current consumption, max.	1 A

### Power loss

Power loss, typ.	12 W
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### Memory

<b>Work memory</b>	
<ul style="list-style-type: none"> <li>• integrated</li> </ul>	48 kbyte; 16 K instructions RAM
<b>Load memory</b>	
<ul style="list-style-type: none"> <li>• expandable FEPRM</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• expandable FEPRM, max.</li> </ul>	512 kbyte
<ul style="list-style-type: none"> <li>• integrated RAM, max.</li> </ul>	80 kbyte
<b>Backup</b>	
<ul style="list-style-type: none"> <li>• present</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• with battery</li> </ul>	Yes; all data
<ul style="list-style-type: none"> <li>• without battery</li> </ul>	Yes; 4736 Byte: parameterizable for memory bits, times, counters, data

### CPU processing times

for bit operations, typ.	0.3 $\mu$ s
for bit operations, max.	0.6 $\mu$ s
for word operations, typ.	1 $\mu$ s
for fixed point arithmetic, typ.	2 $\mu$ s
for floating point arithmetic, typ.	50 $\mu$ s
for timer/counter operations, typ.	12 $\mu$ s

### CPU-blocks

<b>DB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> </ul>	255; DB 0 reserved
<b>FB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> </ul>	192; see instruction list

FC	
• Number, max.	192; see instruction list
OB	
• Number, max.	see instruction list
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	1; OB 10
• Number of cyclic interrupt OBs	1; OB 35
• Number of process alarm OBs	1; OB 40
• Number of startup OBs	1; OB 100
• Number of asynchronous error OBs	7; OB 80, 81, 82, 85, 87, 121, 122
Nesting depth	
• per priority class	8
Counters, timers and their retentivity	
S7 counter	
• Number	64
of which retentive with battery	
— can be set	Yes
— lower limit	0
— upper limit	63
of which retentive without battery	
— can be set	Yes
— lower limit	0
— upper limit	63
Counting range	
— lower limit	0
— upper limit	999
S7 times	
• Number	128
of which retentive with battery	
— adjustable	Yes
— lower limit	0
— upper limit	127
of which retentive without battery	
— adjustable	Yes
— lower limit	0
— upper limit	127
Time range	
— lower limit	10 ms
— upper limit	9 990 s
Data areas and their retentivity	
Flag	

- Number, max. 256 byte
- Retentivity available Yes
- of which retentive with battery 0 to 2047
- of which retentive without battery 0 to 2047

## Address area

### I/O address area

- Inputs 1 kbyte
- Outputs 1 kbyte

### Process image

- Inputs 128 byte
- Outputs 128 byte

## Hardware configuration

- connectable programming devices/PCs SIMATIC PG/PC, standard PC
- Number of modules per system, max. 8
- Number of modules per DP slave interface, max. 32; 122 byte address space per DP station

### Interface modules

- Interface module IM 360 integrated Yes

### Number of DP masters

- integrated 0
- via CP 1; CP 342-5

### Number of operable FMs and CPs (recommended)

- FM 8
- CP, PtP 4
- CP, LAN 2

### Expansion modules

- Analog inputs/outputs, max. 192
- Digital inputs/outputs, max. 768
- Number of expansion modules, max. 24

### Rack

- Modules per rack, max. 8
- Number of lines, max. 3

## Time of day

### Clock

- Hardware clock (real-time) Yes; CPU
- Software clock Yes; OP

## Digital inputs

- Number of digital inputs 16

### Input voltage

- Rated value (DC) 24 V
- for signal "0" -3 to +5V

• for signal "1"	+11 to +30V
<b>Input current</b>	
• for signal "1", typ.	11.5 mA
<b>Input delay (for rated value of input voltage)</b>	
for standard inputs	
— at "0" to "1", max.	4.8 ms; typically 3 ms
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	600 m

### Digital outputs

Number of digital outputs	16
Short-circuit protection	Yes; Clocked electronically
Limitation of inductive shutdown voltage to	48 V
<b>Switching capacity of the outputs</b>	
• on lamp load, max.	5 W
<b>Output voltage</b>	
• for signal "1", min.	L+ (-0.8 V)
<b>Output current</b>	
• for signal "1" rated value	0.5 A
• for signal "1" minimum load current	5 mA
• for signal "0" residual current, max.	0.5 mA
<b>Switching frequency</b>	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
<b>Total current of the outputs (per group)</b>	
all mounting positions	
— up to 20 °C, max.	4 A
— up to 40 °C, max.	2 A
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	600 m

### Universal inputs

Number of universal inputs	4
usable as	UI1, UI2: Digital/alarm input 24 V DC or up/down counter; UI3: Digital/alarm input 24 V DC or up/down counter or frequency/period duration counter; UI4: Digital/alarm input 24 V DC
Counter frequency, max.	10 kHz
<b>Input voltage</b>	
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+11 to +30V

<b>Input current</b>	
• for signal "1"	typ. 11.5 mA
<b>Cable length</b>	
• shielded, max.	1 000 m
<b>Analog inputs</b>	
Number of analog inputs	4
permissible input voltage for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	30 mA
Cycle time (all channels), typ.	2 ms
<b>Input ranges</b>	
• Voltage	Yes
• Current	Yes
<b>Input ranges (rated values), voltages</b>	
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	50 kΩ
<b>Input ranges (rated values), currents</b>	
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	105.5 kΩ
<b>Analog outputs</b>	
Number of analog outputs	4
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	25 mA
Current output, no-load voltage, max.	16 V; +/-
Cycle time (all channels) max.	4 ms; typ. 2 ms
<b>Output ranges, voltage</b>	
• -10 V to +10 V	Yes
<b>Output ranges, current</b>	
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
<b>Load impedance (in rated range of output)</b>	
• with voltage outputs, min.	2 kΩ
• with voltage outputs, capacitive load, max.	1 μF
• with current outputs, max.	0.5 kΩ
• with current outputs, inductive load, max.	1 mH
<b>Cable length</b>	
• shielded, max.	200 m
<b>Analog value generation</b>	
Integration and conversion time/resolution per channel	

<ul style="list-style-type: none"> <li>• Resolution with overrange (bit including sign), max.</li> </ul>	12 bit
<ul style="list-style-type: none"> <li>• Conversion time (per channel)</li> </ul>	0.5 ms
<b>Settling time</b>	
<ul style="list-style-type: none"> <li>• for resistive load</li> </ul>	0.1 ms
<ul style="list-style-type: none"> <li>• for capacitive load</li> </ul>	3.3 ms
<ul style="list-style-type: none"> <li>• for inductive load</li> </ul>	0.5 ms

<b>Encoder</b>	
<b>Connectable encoders</b>	
<ul style="list-style-type: none"> <li>• 2-wire sensor</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— permissible quiescent current (2-wire sensor), max.</li> </ul>	2 mA

<b>Errors/accuracies</b>	
<b>Operational error limit in overall temperature range</b>	
<ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> </ul>	0.8 %
<ul style="list-style-type: none"> <li>• Current, relative to input range, (+/-)</li> </ul>	0.8 %
<ul style="list-style-type: none"> <li>• Voltage, relative to output range, (+/-)</li> </ul>	0.8 %
<ul style="list-style-type: none"> <li>• Current, relative to output range, (+/-)</li> </ul>	1 %
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> </ul>	0.6 %
<ul style="list-style-type: none"> <li>• Current, relative to input range, (+/-)</li> </ul>	0.6 %
<ul style="list-style-type: none"> <li>• Voltage, relative to output range, (+/-)</li> </ul>	0.5 %
<ul style="list-style-type: none"> <li>• Current, relative to output range, (+/-)</li> </ul>	0.6 %

<b>Interfaces</b>	
Number of printer interfaces	1; RS 232
<b>MPI</b>	
<ul style="list-style-type: none"> <li>• Cable length, max.</li> </ul>	9 100 m; without repeaters 50 m; with 2 repeaters: 1100 m; with 10 repeaters in series: 9100 m; via fiber optic cable: 23.8 km (with star hubs or OLMs)

<b>1. Interface</b>	
<b>Functionality</b>	
<ul style="list-style-type: none"> <li>• MPI</li> </ul>	Yes; occupies 2 nodes per device (1 x CPU, 1 x OP)
<ul style="list-style-type: none"> <li>• PROFIBUS DP master</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFIBUS DP slave</li> </ul>	No
<b>MPI</b>	
<ul style="list-style-type: none"> <li>• Number of nodes, max.</li> </ul>	32; PG/PC, OP, C7, S7-300/400, M7
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	187.5 kbit/s

<b>Communication functions</b>	
<b>S7 communication</b>	
<ul style="list-style-type: none"> <li>• S7 extended communication</li> </ul>	Yes; Server
<b>S5 compatible communication</b>	

• supported	Yes
<b>Standard communication (FMS)</b>	
• supported	Yes
<b>Number of connections</b>	
• overall	
— of which dynamic	8
— of which static	4
<b>Interrupts/diagnostics/status information</b>	
Diagnostic functions	Yes; C7-CPU
Substitute values connectable	Yes; Parameterizable
<b>Alarms</b>	
• Alarm cycle	Yes; Parameterizable
• Diagnostic alarm	Yes; Measurement overrange, wire break detection at 4 to 20 mA by means of software; parameterizable for parameter errors
<b>Counter</b>	
Number of counter inputs	3; UE1, UE2, UE3
Principle	Counting of edges
Counting range, description	UI1, UI2: up: 0 to 65535, down: 65535 to 0; UI3: up: 0 to 16777215, down: 16777215 to 0
Counting alarm backward counter	on reaching "0"
Counting alarm forward counter	on reaching limit value
Enable	In the program
Limit value (setpoint) default	one counter per value
<b>External gate counters</b>	
• Number of external gate counters	3
• Principle	Counting of edges within a gate time via external pin
• Counting range	UE1, UE2: 0 to 65535; UE3: 0 to 16777215
<b>Frequency counter</b>	
• Number	1; UI3
• Principle	Counting of pulses within a time period
• Gate width, adjustable	Yes
• Gate width	0.1 / 1 / 10 s (adjustable)
• Counting range	0 to 16777215
<b>Cycle duration counter</b>	
• Number	1; UI3
• Cycle duration, max.	8.38 s; or 0.12 Hz
• Principle	Counting of fixed time units between two positive edges
• Counting range, lower limit	0
• Counting range, upper limit	16 777 214
<b>Potential separation</b>	
Potential separation digital inputs	

<ul style="list-style-type: none"> <li>• Potential separation digital inputs</li> <li>• between the channels, in groups of</li> </ul>	Yes; Optocoupler 16
<b>Potential separation digital outputs</b>	
<ul style="list-style-type: none"> <li>• Potential separation digital outputs</li> <li>• between the channels, in groups of</li> </ul>	Yes; Optocoupler 8
<b>Potential separation analog inputs</b>	
<ul style="list-style-type: none"> <li>• Potential separation analog inputs</li> </ul>	Yes; shared with AO
<b>Potential separation analog outputs</b>	
<ul style="list-style-type: none"> <li>• Potential separation analog outputs</li> </ul>	Yes; shared with AI
<b>Potential separation channels</b>	
<ul style="list-style-type: none"> <li>• Potential separation universal inputs</li> </ul>	No

<b>Isolation</b>	
Isolation tested with	500 V DC

<b>EMC</b>	
EMC interference immunity	Noise immunity: IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-6, EN 50140
<b>Emission of radio interference acc. to EN 55 022</b>	
<ul style="list-style-type: none"> <li>• Interference emission acc. to EN 55022, class A</li> </ul>	Yes; Noise emission: Class A / EN 55022; conducted interference: IEC 1000-4-4, IEC 1000-4-5

<b>Degree and class of protection</b>	
Degree of protection acc. to EN 60529	
<ul style="list-style-type: none"> <li>• IP20</li> <li>• IP65</li> </ul>	Yes; Housing Yes; Front

<b>Standards, approvals, certificates</b>	
CSA approval	Yes; to Standard C22.2 number 142
UL approval	Yes; UL 508
FM approval	Yes; FM-Standards No. 3611, 3600, 3810 Class I, Division 2, Group A, B, C, D
developed in accordance with IEC 61131	Yes; EN 61131-2 (IEC 1131-2)
DIN/ISO 9001	Yes

<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>• 45 degree installation, min.</li> <li>• 45 degree installation, max.</li> <li>• vertical installation, min.</li> <li>• vertical installation, max.</li> </ul>	0 °C 45 °C 0 °C 50 °C
<b>Air pressure acc. to IEC 60068-2-13</b>	
<ul style="list-style-type: none"> <li>• permissible range, lower limit</li> <li>• permissible range, upper limit</li> </ul>	795 hPa 1 080 hPa
<b>Relative humidity</b>	
<ul style="list-style-type: none"> <li>• Operation, min.</li> </ul>	5 %

• Operation, max.	95 %; no condensation
<b>Vibrations</b>	
• Operation, tested according to IEC 60068-2-6	Yes; IEC 60068-2-6; 10 Hz to 58 Hz; (constant amplitude 0.075 mm); 58 Hz to 500 Hz; (constant acceleration 9.8 m/s <sup>2</sup> )
<b>Shock test</b>	
• tested according to IEC 60068-2-29	Yes; IEC 68, Part 2-29 half-sine: 100 m/s <sup>2</sup> (10 g), 16 ms, 100 shocks
<b>Configuration</b>	
<b>Configuration software</b>	
• STEP 7	Yes
• STEP 7 Lite	Yes
• ProTool	Yes
• ProTool/Lite	Yes
• ProTool/Pro	Yes
<b>Programming</b>	
• Command set	see instruction list
• Nesting levels	8
• Program organization	Linear, structured
• System functions (SFC)	see instruction list
<b>Programming language</b>	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
<b>Software libraries</b>	
— Process diagnostics	Yes; C7-CPU
— Software controller	Yes; 16 circles
<b>Know-how protection</b>	
• User program protection/password protection	Yes
<b>Cycle time monitoring</b>	
• lower limit	1 ms
• upper limit	6 000 ms
• adjustable	Yes
• preset	150 ms
<b>Languages</b>	
<b>Online languages</b>	
• Number of online/runtime languages	3
<b>Dimensions</b>	

Width	240 mm
Height	203.5 mm
Depth	90 mm
Mounting cutout, width	231 mm
Mounting cutout, height	159 mm

#### Weights

Weight, approx.	1 800 g
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**last modified:** 11/22/2016