

SIMATIC S7-400, control module FM 455 C, 16 channels,  
continuous, 8/16 AI + 16 DI+ 16 AO



Figure similar

### Supply voltage

#### Load voltage L+

• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V

### Input current

from load voltage L+ (without load), max.	440 mA; typ. 370 mA
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### Power loss

Power loss, typ.	12 W
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### Digital inputs

Number of digital inputs	16
Input characteristic curve in accordance with IEC 61131, type 2	Yes

#### Input voltage

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

<ul style="list-style-type: none"> <li>• for signal "1"</li> </ul>	13 to 30V
<b>Input current</b>	
<ul style="list-style-type: none"> <li>• for signal "1", typ.</li> </ul>	7 mA
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	1 000 m
<ul style="list-style-type: none"> <li>• unshielded, max.</li> </ul>	600 m
<b>Analog inputs</b>	
Number of analog inputs	16; With thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection
permissible input voltage for voltage input (destruction limit), max.	20 V
permissible input current for current input (destruction limit), max.	40 mA
<b>Input ranges</b>	
<ul style="list-style-type: none"> <li>• Voltage</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Current</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Thermocouple</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Resistance thermometer</li> </ul>	Yes
<b>Input ranges (rated values), voltages</b>	
<ul style="list-style-type: none"> <li>• 0 to +10 V</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (0 to 10 V)</li> </ul>	100 k $\Omega$
<ul style="list-style-type: none"> <li>• -1.75 V to +11.75 V</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (-1.75 V to +11.75 V)</li> </ul>	100 k $\Omega$
<ul style="list-style-type: none"> <li>• -80 mV to +80 mV</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (-80 mV to +80 mV)</li> </ul>	10 M $\Omega$
<b>Input ranges (rated values), currents</b>	
<ul style="list-style-type: none"> <li>• 0 to 20 mA</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (0 to 20 mA)</li> </ul>	50 $\Omega$
<ul style="list-style-type: none"> <li>• 0 to 23.5 mA</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (0 to 23.5 mA)</li> </ul>	50 $\Omega$
<ul style="list-style-type: none"> <li>• -3.5 mA to +23.5 mA</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (-3.5 mA to +23.5 mA)</li> </ul>	50 $\Omega$
<ul style="list-style-type: none"> <li>• 4 mA to 20 mA</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (4 mA to 20 mA)</li> </ul>	50 $\Omega$
<b>Input ranges (rated values), thermocouples</b>	
<ul style="list-style-type: none"> <li>• Type B</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (Type B)</li> </ul>	10 M $\Omega$
<ul style="list-style-type: none"> <li>• Type J</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (type J)</li> </ul>	10 M $\Omega$
<ul style="list-style-type: none"> <li>• Type K</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Input resistance (Type K)</li> </ul>	10 M $\Omega$
<ul style="list-style-type: none"> <li>• Type R</li> </ul>	Yes

• Input resistance (Type R)	10 M $\Omega$
• Type S	Yes
• Input resistance (Type S)	10 M $\Omega$
<b>Input ranges (rated values), resistance thermometer</b>	
• Pt 100	Yes
• Input resistance (Pt 100)	10 M $\Omega$
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
— internal temperature compensation	Yes; Parameterizable
— external temperature compensation with Pt100	Yes; Parameterizable
<b>Characteristic linearization</b>	
• parameterizable	Yes
— for thermocouples	Type B, J, K, R, S
— for resistance thermometer	Pt100 (standard)
<b>Cable length</b>	
• shielded, max.	200 m; 50 m at 80 mV and thermocouples
<b>Analog outputs</b>	
Number of analog outputs	16
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	25 mA
Current output, no-load voltage, max.	18 V
<b>Output ranges, voltage</b>	
• 0 to 10 V	Yes
• -10 V to +10 V	Yes
<b>Output ranges, current</b>	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
<b>Connection of actuators</b>	
• for voltage output two-wire connection	Yes
• for current output two-wire connection	Yes
<b>Load impedance (in rated range of output)</b>	
• with voltage outputs, min.	1 k $\Omega$
• with voltage outputs, capacitive load, max.	1 $\mu$ F
• with current outputs, max.	500 $\Omega$
• with current outputs, inductive load, max.	1 mH
<b>Cable length</b>	
• shielded, max.	200 m; 50 m at 80 mV and thermocouples
<b>Analog value generation for the inputs</b>	
Measurement principle	integrating

Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> </ul>	14 bit; 12 bit or 14 bit, parameterizable
<ul style="list-style-type: none"> <li>Conversion time (per channel)</li> </ul>	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 Hz and 60 Hz
Analog value generation for the outputs	
Settling time	
<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
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> <li>for voltage measurement</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for current measurement as 4-wire transducer</li> </ul>	Yes
Connectable encoders	
<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>	1.5 mA
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.05 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Linearity error (relative to output range), (+/-)	0.05 %
Temperature error (relative to output range), (+/-)	0.02 %/K
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	±0.6 to ±1%
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	±0.6 to ±1%
<ul style="list-style-type: none"> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>	±0.6 to ±1%
<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 %
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	±0.4 to ±0.6 %
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	±0.4 to ±0.6 %
<ul style="list-style-type: none"> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>	±0.4 to ±0.6 %
<ul style="list-style-type: none"> <li>Voltage, relative to output range, (+/-)</li> </ul>	0.4 %
<ul style="list-style-type: none"> <li>Current, relative to output range, (+/-)</li> </ul>	0.5 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1 =$ interference frequency	
<ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> </ul>	40 dB
<ul style="list-style-type: none"> <li>Common mode interference (USS &lt; 2.5 V), min.</li> </ul>	70 dB

Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Integrated Functions	
Control technology	
<ul style="list-style-type: none"> <li>Number of closed-loop controllers</li> </ul>	16; With thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection
Potential separation	
Potential separation controller	
<ul style="list-style-type: none"> <li>between the channels</li> <li>between the channels and backplane bus</li> </ul>	No Yes; Optocoupler
Permissible potential difference	
Between the inputs and MANA (UCM)	2.5 V DC
between M internally and the inputs	75 V DC/60 V AC
Isolation	
Isolation tested with	500 V DC
Connection method	
required front connector	2x 48-pin
Dimensions	
Width	50 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	1 400 g
<b>last modified:</b>	08/13/2018