

SIMATIC S7-400, EXM 438-1 I/O extension for FM 458 4x analog outputs 16-bit EXM 438-1 not spare part-compatible for EXM438



Supply voltage	
Rated value (DC)	
<ul style="list-style-type: none"> <li>• 5 V DC</li> <li>• 24 V DC</li> </ul>	<p>Yes</p> <p>Yes; to be set up externally</p>
Input current	
Current consumption, typ.	1.5 A
Encoder supply	
Type of output voltage	about 14 V (non-isolated)
Short-circuit protection	Yes; Electronic
Output current	
<ul style="list-style-type: none"> <li>• Rated value</li> </ul>	100 mA
Power loss	
Power loss, typ.	7.5 W
Hardware configuration	
Slots	
<ul style="list-style-type: none"> <li>• required slots</li> </ul>	1
Digital inputs	

Number of digital inputs	16
<b>Input voltage</b>	
<ul style="list-style-type: none"> <li>• Rated value (DC)</li> <li>• for signal "0"</li> <li>• for signal "1"</li> </ul>	24 V -1 to +6 V or input open +13 to +33V
<b>Input current</b>	
<ul style="list-style-type: none"> <li>• for signal "0", max. (permissible quiescent current)</li> <li>• for signal "1", typ.</li> </ul>	0 mA 3 mA
<b>Input delay (for rated value of input voltage)</b>	
for standard inputs	
— at "0" to "1", max.	200 $\mu$ s
<b>Digital outputs</b>	
Number of digital outputs	8
Short-circuit protection	Yes; electronic/thermal
<ul style="list-style-type: none"> <li>• Response threshold, typ.</li> </ul>	250 mA
Limitation of inductive shutdown voltage to	Supply voltage +1 V
<b>Output voltage</b>	
<ul style="list-style-type: none"> <li>• for signal "0", max.</li> <li>• for signal "1", max.</li> </ul>	3 V Supply voltage -2.5 V
<b>Output current</b>	
<ul style="list-style-type: none"> <li>• for signal "1" rated value</li> <li>• for signal "1" permissible range for 0 to 40 °C, min.</li> <li>• for signal "0" residual current, max.</li> <li>• Total switching current</li> </ul>	50 mA 100 mA 20 $\mu$ A 80% at 50 °C all outputs 50 mA
<b>Output delay with resistive load</b>	
<ul style="list-style-type: none"> <li>• "0" to "1", max.</li> </ul>	15 $\mu$ s
<b>Analog inputs</b>	
Number of analog inputs	5; Differential inputs
<b>Input ranges (rated values), voltages</b>	
<ul style="list-style-type: none"> <li>• -10 V to +10 V</li> <li>— Input resistance (-10 V to +10 V)</li> </ul>	Yes; -10 V: $\pm 4$ LSB; to +10 V: $\pm 4$ LSB (1 LSB = 4.88 mV) 470 k $\Omega$
<b>Analog outputs</b>	
Number of analog outputs	8; 4 outputs 16 bit; 4 outputs 12 bit
Voltage output, short-circuit protection	Yes; relative to frame
Voltage output, short-circuit current, max.	16 bit: 27 mA; 12 bit: 100 mA
<b>Output ranges, voltage</b>	
<ul style="list-style-type: none"> <li>• -10 V to +10 V</li> </ul>	Yes
<b>Analog value generation for the inputs</b>	
Integration and conversion time/resolution per channel	

• Resolution with overrange (bit including sign), max.	12 bit
• Conversion time (per channel)	45 µs

### Analog value generation for the outputs

#### Integration and conversion time/resolution per channel

• Resolution with overrange (bit including sign), max.	4 AO: 16 bit, 4 AO: 12 bit
• Conversion time (per channel)	4 AO (16 bit): 2 µs; 4 AO (12 bit): 4 µs

### Encoder

Number of connectable encoders, max. 12; 8 incremental encoders (synchronizable), 4 absolute encoders

#### Connectable encoders

• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface

#### Encoder signals, incremental encoder (symmetrical)

• Trace mark signals	1) for tracks A and B (90° out of phase), poss. with zero pulse N; 2) for separate forward and backward track
• Input voltage	With 0 signal: -5 to 0 V; with 1 signal: +3 to +5 V; permissible input voltage range: differential voltage -5 to +5 V; max. input current: 15 mA (important: not limited on module side!)

#### Encoder signals, incremental encoder (asymmetrical)

• Trace mark signals	Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N
• Input voltage	with 0 signal: -30 to +4 V (at 15 mA load); with 1 signal: +8 to 30 V (at 15 mA load); permissible input voltage range: differential voltage -30 to +30 V

#### Encoder signals, absolute encoder (SSI)

• Input signal	5 V acc. to RS 422
• Data signal	Dual-, Gray-, Gray-Excess-Code
• Clock frequency, max.	2 MHz; 100 kHz to 2 MHz (depending on cable length)

### Errors/accuracies

Linearity error (relative to output range), (+/-) (±1 LSB)

### Potential separation

#### Potential separation digital inputs

• Potential separation digital inputs	No
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#### Potential separation digital outputs

• Potential separation digital outputs	No
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#### Potential separation analog inputs

• Potential separation analog inputs	No
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#### Potential separation analog outputs

• Potential separation analog outputs	No
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## Weights

Weight, approx.

1 kg

**last modified:**

06/12/2020