



SIMATIC S7-400, EXM 438-1 I/O EXPANSION MODULE FOR FM 458 4 X ANALOG OUTPUTS 16 BIT EXM 438-1 NOT SPAREPART COMPATIBLE TO 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>• nominal</li> </ul>  | 100 mA  |
| Hardware configuration   |   |
| Slots  |   |
| <ul style="list-style-type: none"> <li>• Required slots</li> </ul>   | 1   |
| Digital inputs   |   |
| Number of digital inputs   | 16  |
| Input voltage  |   |
| <ul style="list-style-type: none"> <li>• Rated value (DC)</li> <li>• for signal "0"</li> <li>• for signal "1"</li> </ul> | <p>24 V</p> <p>-1 to +6 V or input open</p> <p>+13 to +33 V</p> |
| Input current  |   |
| <ul style="list-style-type: none"> <li>• for signal "0", max. (permissible quiescent current)</li> </ul>                 | 0 mA  |

|   |        |
|---|--------|
| • for signal "1", typ.                                | 3 mA   |
| <b>Input delay (for rated value of input voltage)</b> |        |
| for standard inputs                                   |        |
| — at "0" to "1", max.                                 | 200 µs |

### Digital outputs

|   |                                |
|---|--------------------------------|
| Number of digital outputs                               | 8                              |
| short-circuit protection                                | Yes; electronic/thermal        |
| • Response threshold, typ.                              | 250 mA                         |
| Limitation of inductive shutdown voltage to             | Supply voltage +1 V            |
| <b>Output voltage</b>                                   |                                |
| • for signal "0", max.                                  | 3 V                            |
| • for signal "1", max.                                  | Supply voltage -2.5 V          |
| <b>Output current</b>                                   |                                |
| • for signal "1" rated value                            | 50 mA                          |
| • for signal "1" permissible range for 0 to 40 °C, min. | 100 mA                         |
| • for signal "0" residual current, max.                 | 20 µA                          |
| • Total switching current                               | 80% at 50 °C all outputs 50 mA |
| <b>Output delay with resistive load</b>                 |                                |
| • "0" to "1", max.                                      | 15 µs                          |

### Analog inputs

|  |  |
|--|--|
| Number of analog inputs                      | 5; Differential inputs                                     |
| <b>Input ranges (rated values), voltages</b> |  |
| • -10 V to +10 V                             | Yes; -10 V: +/-4 LSB; to +10 V: +/-4 LSB (1 LSB = 4.88 mV) |
| • Input resistance (-10 V to +10 V)          | 470 kΩ   |

### Analog outputs

|   |                                       |
|---|---------------------------------------|
| 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 bits: 27 mA; 12 bits: 100 mA       |
| <b>Output ranges, voltage</b>               |                                       |
| • -10 V to +10 V                            | Yes                                   |

### Analog value creation

|   |   |
|---|---|
| <b>Integration and conversion time/resolution per channel</b> |   |
| • Resolution with overrange (bit including sign), max.        | 4 AO: 16 bits, 4 AO: 12 bits, 5 AI: 12 bits             |
| • Conversion time (per channel)                               | 4 AO (16 bits): 2 µs; 4 AO (12 bits): 4 µs; 5 AI: 45 µs |

### Encoder

|                                      |  |
|--------------------------------------|--|
| Number of connectable encoders, max. | 12; 8 incremental encoders (synchronizable), 4 absolute encoders |
| <b>Connectable encoders</b>          |  |
| • Incremental encoder (symmetrical)  | Yes  |

|  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Incremental encoder (asymmetrical)</li> <li>• Absolute encoder (SSI)</li> </ul> | <p>Yes</p> <p>Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface</p>   |
| <b>Encoder signals, incremental encoder (symmetrical)</b>  |   |
| <ul style="list-style-type: none"> <li>• Trace mark signals</li> <li>• Input signal</li> </ul>                           | <p>1) for tracks A and B (90° out of phase), poss. with zero pulse N;<br/>2) for separate forward and backward track</p> <p>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!)</p> |
| <b>Encoder signals, incremental encoder (asymmetrical)</b>   |   |
| <ul style="list-style-type: none"> <li>• Trace mark signals</li> <li>• Input voltage</li> </ul>                          | <p>Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N</p> <p>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</p>   |
| <b>Encoder signals, absolute encoder (SSI)</b>   |   |
| <ul style="list-style-type: none"> <li>• Input signal</li> <li>• Data signal</li> <li>• Clock frequency, max.</li> </ul> | <p>5 V acc. to RS 422</p> <p>Dual-, Gray-, Gray-Excess-Code</p> <p>2 MHz; 100 kHz to 2 MHz (depending on cable length)</p>  |

### Errors/accuracies

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

### Galvanic isolation

|   |    |
|---|----|
| <b>Galvanic isolation digital inputs</b>  |    |
| • Galvanic isolation digital inputs       | No |
| <b>Galvanic isolation digital outputs</b> |    |
| • Galvanic isolation digital outputs      | No |
| <b>Galvanic isolation analog inputs</b>   |    |
| • Galvanic isolation analog inputs        | No |
| <b>Galvanic isolation analog outputs</b>  |    |
| • Galvanic isolation analog outputs       | No |

### Weights

|                 |      |
|-----------------|------|
| Weight, approx. | 1 kg |
|-----------------|------|

**last modified:** 12.03.2015