



*** spare part *** 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)	
• 5 V DC	Yes
• 24 V DC	Yes; to be set up externally
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	
• Rated value	100 mA
Power loss	
Power loss, typ.	7.5 W
Digital inputs	
Number of digital inputs	16
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-1 to +6 V or input open
• for signal "1"	+13 to +33V
Input current	
• for signal "0", max. (permissible quiescent current)	0 mA
• for signal "1", typ.	3 mA
Input delay (for rated value of input voltage)	
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
Output voltage	
• for signal "0", max.	3 V
• for signal "1", max.	Supply voltage -2.5 V
Output current	
• 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
Output delay with resistive load	
• "0" to "1", max.	15 µs

Analog inputs			
Number of analog inputs	5; Differential inputs		
Input ranges (rated values), voltages			
-10 V to +10 V — Input resistance (-10 V to +10 V)	Yes; -10 V: ±4 LSB; to +10 V: ±4 LSB (1 LSB = 4.88 mV) 470 kΩ		
Analog outputs			
Number of analog outputs	8; 4 outputs 16 bit; 4 outputs12 bit		
Voltage output, short-circuit protection	Yes; relative to frame		
Voltage output, short-circuit current, max.	16 bit: 27 mA; 12 bit: 100 mA		
Output ranges, voltage			
-10 V to +10 V	Yes		
Analog value generation for the inputs			
Integration and conversion time/resolution per channel			
- Resolution with overrange (bit including sign), max. - Conversion time (per channel)	12 bit 45 μs		
Analog value generation for the outputs			
Integration and conversion time/resolution per channel			
- Resolution with overrange (bit including sign), max. - Conversion time (per channel)	4 AO: 16 bit, 4 AO: 12 bit 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) - Incremental encoder (asymmetrical) - Absolute encoder (SSI)	Yes Yes Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface		
Encoder signals, incremental encoder (symmetrical)			
- Trace mark signals - Input voltage	1) for tracks A and B (90° out of phase), poss. with zero pulse N; 2) for separate forward and backward track 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 - Input voltage	Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N 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 - Data signal - Clock frequency, max.	5 V acc. to RS 422 Dual-, Gray-, Gray-Excess-Code 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		
Potential separation digital outputs			
Potential separation digital outputs	No		
Potential separation analog inputs			
Potential separation analog inputs	No		
Potential separation analog outputs			
Potential separation analog outputs	No		
Dimensions			
Width	24 mm		
Height	290 mm		
Depth	210 mm		
Weights			
Weight, approx.	1 kg		
Classifications			
		Version	Classification
	eClass	14	27-24-22-05
	eClass	12	27-24-22-05

eClass	9.1	27-24-22-05
eClass	9	27-24-22-05
eClass	8	27-24-22-05
eClass	7.1	27-24-22-05
eClass	6	27-24-22-05
ETIM	9	EC001422
ETIM	8	EC001422
ETIM	7	EC001422
IDEA	4	3567
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval	EMV
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[Miscellaneous](#)



EMV	For use in hazardous locations
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[Miscellaneous](#)



For use in hazardous locations	Marine / Shipping
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