



SIMATIC S7-400, CONTROL MODULE FM 455 S, 16 CHANNELS, STEP AND PULSE 8/16 AI + 16 DI + 32 DO

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.	400 mA; typ. 330 mA
Power losses	
Power loss, typ.	10.7 W
Power loss, max.	16.2 W
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
• for signal "1"	13 to 30V
Input current	
• for signal "1", typ.	7 mA
Cable length	
• shielded, max.	1 000 m
• Unshielded, max.	600 m

Digital outputs	
Number of digital outputs	32
short-circuit protection	Yes; Electronic
Limitation of inductive shutdown voltage to	L+ (-1.5 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
• on lamp load, max.	5 W
Load resistance range	
• lower limit	240 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-2.5 V)
Output current	
• for signal "1" rated value	0.1 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	150 mA
• for signal "0" residual current, max.	0.5 mA
Parallel switching of 2 outputs	
• for logic links	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	100 Hz
Cable length	
• shielded, max.	1 000 m
• Unshielded, max.	600 m
Analog inputs	
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
Input ranges	
• Voltage	Yes
• Current	Yes
• Thermocouple	Yes
• Resistance thermometer	Yes
Input ranges (rated values), voltages	
• 0 to +10 V	Yes

• Input resistance (0 to 10 V)	100 k Ω
• -1.75 V to +11.75 V	Yes
• Input resistance (-1.75 V to +11.75 V)	100 k Ω
• -80 mV to +80 mV	Yes
• Input resistance (-80 mV to +80 mV)	10 M Ω
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 0 to 23.5 mA	Yes
• Input resistance (0 to 23.5 mA)	50 Ω
• -3.5 mA to +23.5 mA	Yes
• Input resistance (-3.5 mA to +23.5 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Input ranges (rated values), thermoelements	
• Type B	Yes
• Input resistance (Type B)	10 M Ω
• Type J	Yes
• Input resistance (type J)	10 M Ω
• Type K	Yes
• Input resistance (Type K)	10 M Ω
• Type R	Yes
• Input resistance (Type R)	10 M Ω
• Type S	Yes
• Input resistance (Type S)	10 M Ω
Input ranges (rated values), resistance thermometer	
• Pt 100	Yes
• Input resistance (Pt 100)	10 M Ω
Thermocouple (TC)	
Temperature compensation	
— internal temperature compensation	Yes; Parameterizable
— external temperature compensation with Pt100	Yes; Parameterizable
Characteristic linearization	
• Parameterizable	Yes
— for thermocouples	Type B, J, K, R, S
— for resistance thermometer	Pt100 (standard)
Cable length	
• shielded, max.	200 m; 50 m at 80 mV and thermocouples
Analog value creation	
Measurement principle	integrating

Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> Resolution with overrange (bit including sign), max. Conversion time (per channel) 	14 bit; 12 or 14 bit, parameterizable 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 and 60 Hz
Settling time	
<ul style="list-style-type: none"> for resistive load for capacitive load for inductive load 	0.1 ms 3.3 ms 0.5 ms
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> for voltage measurement for current measurement as 4-wire transducer 	Yes Yes
Connectable encoders	
<ul style="list-style-type: none"> 2-wire sensor — Permissible quiescent current (2-wire sensor), max. 	Yes 1.5 mA
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.05 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Operational limit in overall temperature range	
<ul style="list-style-type: none"> Voltage, relative to input area, (+/-) Current, relative to input area, (+/-) Resistance thermometer, relative to input area, (+/-) 	+/-0.6 to +/-1% +/-0.6 to +/-1% +/-0.6 to +/-1%
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> Voltage, relative to input area, (+/-) Current, relative to input area, (+/-) Resistance thermometer, relative to input area, (+/-) 	+/-0.4 to +/-0.6 % +/-0.4 to +/-0.6 % +/-0.4 to +/-0.6 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency	
<ul style="list-style-type: none"> Series mode interference (peak value of interference < rated value of input range), min. common mode voltage (USS < 2.5 V), min. 	40 dB 70 dB
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Control technology	
Number of closed-loop controllers	16; With thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection
Galvanic isolation	
Galvanic isolation controller	

- between the channels
- between the channels and the backplane bus

No
Yes; Optocoupler

Permissible potential difference

between inputs and MANA (UCM)	2.5 V DC
between M internally and the inputs	75V DC/60V AC

Isolation

Isolation checked with	500 V DC
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Connection method

required front connector	2x 48-pin
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Dimensions

Width	50 mm
Height	290 mm
Depth	210 mm

Weights

Weight, approx.	1 400 g
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last modified: 12.03.2015