

## Data sheet

SM 031 (031-1CD70)

## Technical data

Order no.	031-1CD70
Туре	SM 031
Module ID	040E 1544
General information	
Note	-
Features	4x AI 16 Bit Voltage -10 V+10 V
Current consumption/power loss	
Current consumption from backplane bus	65 mA
Power loss	0.9 W
Technical data analog inputs	
Number of inputs	4
Cable length, shielded	200 m
Rated load voltage	DC 24 V
Current consumption from load voltage L+ (without load)	25 mA
Voltage inputs	yes
Min. input resistance (voltage range)	200 kOhm
Input voltage ranges	-10 V +10 V 0 V +10 V
Operational limit of voltage ranges	+/-0.2%
Operational limit of voltage ranges with SFU	-
Basic error limit voltage ranges	+/-0.1%
Basic error limit voltage ranges with SFU	-
Destruction limit voltage	max. 30V
Current inputs	-
Max. input resistance (current range)	-
Input current ranges	-
Operational limit of current ranges	-
Operational limit of current ranges with SFU	-
Basic error limit current ranges	-
Radical error limit current ranges with SFU	-
Destruction limit current inputs (voltage)	-
Destruction limit current inputs (electrical current)	-
Resistance inputs	-
Resistance ranges	-
Operational limit of resistor ranges	-
Operational limit of resistor ranges with SFU	-
Basic error limit	-
Basic error limit with SFU	-
Destruction limit resistance inputs	-
Resistance thermometer inputs	-
Resistance thermometer ranges	-

## YASKAWA VIPA CONTROLS

Courational limit of resistance thermometer ranges with SPU - Basic error limit thermoresistor ranges - Basic error limit thermoresistor ranges with SPU - Destruction limit resistance thermometer inputs - Thermocupile inputs - Thermocupile ranges - Operational limit of thermocoupile ranges with SPU - Basic error limit thermoclement ranges with SPU - Basic error limit thermoclement ranges with SPU - Operational imit of thermocoupile ranges with SPU - Destruction limit thermoclement ranges with SPU - Operational imit of thermocoupile ranges with SPU - Operational imit of thermocoupile ranges with SPU - Operational limit of thermocoupile ranges w	Operational limit of resistance thermometer ranges	-
Basic error limit thermoresistor ranges with SFU - Destruction limit resistance thermoneter inputs - Destruction limit of thermocuple ranges - Deperational limit of thermocuple ranges with SFU - Destruction limit thermoelement ranges - Destruction limit thermoelement ranges with SFU - Destructio	<u> </u>	
Basic error limit thermoresistor ranges with SFU Destruction limit resistance thermometer inputs Thermocouple inputs - Thermocouple ranges - Operational limit of thermocouple ranges - Basic error limit thermoelement ranges with SFU Operational limit thermoelement ranges - Basic error limit thermoelement ranges with SFU Operational limit thermoelement ranges - Destruction limit thermoelement ranges - Operational limit of thermoel		
Destruction limit resistance thermometer inputs	•	-
Thermocouple inputs	<u> </u>	
Thermocouple ranges - Operational limit of thermocouple ranges with SFU - Basic error limit thermocelment ranges with SFU - Basic error limit thermocelment ranges with SFU - Destruction limit thermocelment ranges with SFU - Destruction limit thermocelment ranges with SFU - Programmable temperature compensation - Internal temperature compensation - Internal temperature compensation - Temperature error internal compensation - Technical unit of temperature measurement - Technical with the mocelland internal compensation - Temperature error internal compensation - Technical difference between input (Umn) DC 9 V Max. potential difference between inputs and Mana (Umn) DC 75 V/ AC 50 V Max. potential difference between inputs and Mana (Umn) DC 75 V/ AC 50 V Max. potential difference between inputs and Mana (Umn) DC 75 V/ AC 50 V Technical data encoder supply Number of outputs - Installation - Technical data encoder supply Number of outputs - Unique votage (rated value) -	'	
Operational limit of thermocouple ranges - Operational limit of thermocouple ranges with SFU - Basic error limit thermoclement ranges		
Operational limit of thermocouple ranges with SFU - Basic error limit thermoelement ranges - Basic error limit thermoelement ranges with SFU - Programmable temperature compensation - External temperature compensation - External temperature compensation - Internal temperature compensation - Temperature error internal compensation - Temperature error internal compensation - Technical unit of temperature measurement - Resolution in bit 16 Measurement principle successive approximation Basic conversion time 480 µs all channels Noise suppression for frequency >80dB at 50Hz (UCM-35V)  Status information, alarms, diagnostics  Status display yes Interrupts yes, parameterizable Process alarm yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostic information read-out possible Module error display red LED Module error display red LED Channel error display red LED Extenen channels of groups to - Between channels and backplane bus Between channels and backplane bus Between channels of groups to - Between channels and backplane bus Between channels of difference between inputs (Ucm) Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mana (Ucm) - Max. potential difference between inputs and Mintern (Uso) DC 75 V/ AC 50 V  Technical data encoder supply Number of outputs  Output voltage (rated value) -		
Basic error limit thermoelement ranges   Basic error limit thermoelement ranges with SFU   Destruction limit thermocuple inputs   Programmable temperature compensation   External temperature compensation   Temperature error internal compensation   Technical unit of temperature examination   Temperature error internal compensation   Technical internal compensation   Temperature error internal compensation	· · · · · · · · · · · · · · · · · · ·	
Basic error limit thermoelement ranges with SPU  Destruction limit thermocouple inputs  - Programmable temperature compensation  External temperature compensation  - Internal temperature compensation  - Temperature error internal compensation  - Temperature error internal compensation  - Technical unit of temperature measurement  - Resolution in bit  16  Measurement principle  Basic conversion time  480 µs all channels  Noise suppression for frequency  >80dB at 50Hz (UCM-35V)  Status information, alarms, diagnostics  Status display  yes  Interrupts  yes, parameterizable  Process alarm  yes, parameterizable  Diagnostic interrupt  yes, parameterizable  Diagnostic functions  yes  Diagnostics information read-out  possible  Module state  Module state  Module error display  red LED  Channel error display  red LED  Channel error display  red LED  Between channels  -  Between channels and backplane bus  Between channels and backplane bus  Between channels and backplane bus  Between channels and bower supply  Max. potential difference between inputs (Lorm)  Max. potential difference between inputs and Mintern (Uiso)  Max.	· · · ·	
Destruction limit thermocouple inputs Programmable temperature compensation External temperature compensation - Internal temperature compensation - Internal temperature compensation - Technical unit of temperature measurement - Resolution in bit 16 Measurement principle Successive approximation Basic conversion time 480 µs all channels Basic conversion for frequency >80dB at 50Hz (UCM<35V)  Status information, alarms, diagnostics  Status display yes Interrupts yes, parameterizable Process alarm yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostics information read-out Module state Module state green LED Module error display red LED Channel error display red LED per channel  Between channels Between channels Between channels and backplane bus yes Between channels and power supply Max. potential difference between inputs (uron) Max. potential difference between inputs and Mintern (Uiso) Max. potential difference between Nana and Mintern (Uiso) Max. potential difference between Mintern and outputs Insulation tested with DC 500 V Technical data encoder supply Number of outputs Output voltage (rated value)  - Cuppt voltage (rated value) - Cuppt voltage (rated value) -		
Programmable temperature compensation - External temperature compensation - Internal temperature compensation - Temperature error internal compensation - Temperature error internal compensation - Technical unit of temperature measurement - Resolution in bit 16 Measurement principle successive approximation Basic conversion time 480 µs all channels Noise suppression for frequency >80dB at 50Hz (UCM<35V)  Status display yes Interrupts yes, parameterizable Process alarm yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostic interrupt yes, parameterizable Diagnostic information read-out possible Module state green LED Module error display red LED Channel error display red LED Esteven channels of groups to - Between channels of groups to - Between channels and backplane bus yes Between channels and power supply yes Max. potential difference between inputs and Mana (Ucm) Max. potential difference between linputs and Mana (Ucm) Max. potential difference between Mana and Mintern (Uiso) Max. potential difference between Mintern and outputs - Insulation tested with DC 500 V Technical data encoder supply Number of outputs Output voltage (typ) - Cupput voltage (rated value) -		
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Temperature error internal compensation Technical unit of temperature measurement Technical data encoder supply Technical data encoder supply Technical data encoder supply Technical data encoder supply Number of outputs Technical data encoder supply Te		
Technical unit of temperature measurement  Resolution in bit  Measurement principle  Basic conversion time  480 µs all channels  Noise suppression for frequency  >80dB at 50Hz (UCM<35V)  Status information, alarms, diagnostics  Status display  yes  Interrupts  Process alarm  plagnostic functions  Diagnostic functions  pes  Diagnostic functions  Diagnostic information read-out  Module state  Green LED  Module error display  red LED  Channel error display  Red LED  Between channels  Between channels  Between channels  Between channels and backplane bus  Between channels and power supply  Max. potential difference between inputs (ucm)  Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between inputs and Mintern (Uiso)  Max. potential difference between Mintern and outputs  -  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  -  Output voltage (typ)  Output voltage (grated value)		
Resolution in bit 16  Measurement principle successive approximation  Basic conversion time 480 µs all channels  Noise suppression for frequency >80dB at 50Hz (UCM<35V)  Status information, alarms, diagnostics  Status display yes  Interrupts yes, parameterizable  Process alarm yes, parameterizable  Diagnostic interrupt yes, parameterizable  Diagnostic interrupt yes, parameterizable  Diagnostic interrupt yes, parameterizable  Diagnostic information read-out possible  Module state green LED  Module error display red LED  Channel error display red LED  Selween channels  Between channels of groups to -  Between channels of groups to -  Between channels and backplane bus yes  Between channels and power supply yes  Max. potential difference between inputs (Ucm) DC 9 V  Max. potential difference between Mana and Mintern (Uiso)  Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between Mintern and outputs -  Insulation tested with DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value) -	<u> </u>	
Measurement principle Basic conversion time A80 µs all channels Noise suppression for frequency >80dB at 50Hz (UCM<35V)  Status information, alarms, diagnostics  Status display yes Interrupts yes, parameterizable Process alarm yes, parameterizable Diagnostic interrupt Diagnostic interrupt yes, parameterizable Diagnostic information read-out possible Module state green LED Module error display red LED per channel Isolation  Between channels - Between channels of groups to Between channels and backplane bus Between channels and power supply Max. potential difference between inputs (Ucm) Max. potential difference between inputs and Mana (Ucm) Max. potential difference between inputs and Mana (Ucm) Max. potential difference between hintern and outputs Insulation tested with DC 500 V  Technical data encoder supply Number of outputs Output voltage (typ) Output voltage (rated value) - Sudd at 50Hz (UCM<35V) Sudd	·	
Basic conversion time 480 µs all channels  Noise suppression for frequency >80dB at 50Hz (UCM<35V)  Status information, alarms, diagnostics  Status display yes  Interrupts yes, parameterizable  Process alarm yes, parameterizable  Diagnostic interrupt yes, parameterizable  Diagnostic functions yes  Diagnostic sinformation read-out possible  Module state green LED  Module error display red LED  Channel error display red LED  Setween channels -  Between channels -  Between channels of groups to -  Between channels and backplane bus yes  Between channels and power supply yes  Max. potential difference between inputs (Ucm) DC 9 V  Max. potential difference between inputs and Mana (Ucm) -  Max. potential difference between hintern and outputs of Insulation tested with DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value) -		
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Diagnostic interrupt Diagnostic functions Diagnostics information read-out Diagnostics information read-out Module state Module error display Ted LED Thannel error display Ted LED Te	<u> </u>	
Diagnostic functions  Diagnostics information read-out  Module state  Module error display  Channel error display  red LED  Ted LED per channel  Isolation  Between channels  Between channels of groups to  Between channels and backplane bus  Between channels and power supply  Max. potential difference between inputs (Ucm)  Max. potential difference between Mana and Mintern (Uiso)  Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between Mana and Mintern (Uiso)  DC 75 V/ AC 50 V  Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  -  Output voltage (rated value)  -		
Diagnostics information read-out possible  Module state green LED  Module error display red LED  Channel error display red LED per channel  Isolation  Between channels -  Between channels of groups to -  Between channels and backplane bus yes  Between channels and power supply yes  Max. potential difference between circuits -  Max. potential difference between inputs (Ucm) DC 9 V  Max. potential difference between Mana and Mintern (Uiso) -  Max. potential difference between inputs and Mana (Ucm) -  Max. potential difference between inputs and Mana (Ucm) -  Max. potential difference between inputs and Mintern (Uiso) DC 75 V/ AC 50 V  Max. potential difference between Mintern and outputs -  Insulation tested with DC 500 V  Technical data encoder supply  Number of outputs -  Output voltage (typ) -		
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Module error display red LED  Channel error display red LED per channel  Isolation  Between channels -  Between channels of groups to -  Between channels and backplane bus yes  Between channels and power supply yes  Max. potential difference between circuits -  Max. potential difference between inputs (Ucm) DC 9 V  Max. potential difference between inputs and Mintern (Uiso) -  Max. potential difference between inputs and Mana (Ucm) -  Max. potential difference between inputs and Mintern (Uiso) DC 75 V/ AC 50 V  Max. potential difference between Mintern and outputs -  Insulation tested with DC 500 V  Technical data encoder supply  Number of outputs -  Output voltage (typ) -  Output voltage (rated value) -		<u> </u>
Channel error display red LED per channel  Isolation  Between channels		
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Between channels and backplane bus  Between channels and power supply  Max. potential difference between circuits  Max. potential difference between inputs (Ucm)  Max. potential difference between Mana and Mintern (Uiso)  Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between inputs and Mintern (Uiso)  Max. potential difference between inputs and Mintern (Uiso)  DC 75 V/ AC 50 V  Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value)		-
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Max. potential difference between inputs (Ucm)  Max. potential difference between Mana and Mintern (Uiso)  Max. potential difference between Mana and Mintern (Uiso)  Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between inputs and Mintern (Uiso)  Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value)	'	yes
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Max. potential difference between inputs and Mana (Ucm)  Max. potential difference between inputs and Mintern (Uiso)  Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value)		
Max. potential difference between inputs and Mintern (Uiso)  Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value)	. , , ,	-
Max. potential difference between Mintern and outputs  Insulation tested with  DC 500 V  Technical data encoder supply  Number of outputs  Output voltage (typ)  Output voltage (rated value)  -		
Insulation tested with DC 500 V  Technical data encoder supply  Number of outputs -  Output voltage (typ) -  Output voltage (rated value) -		DC 75 V/ AC 50 V
Technical data encoder supply  Number of outputs -  Output voltage (typ) -  Output voltage (rated value) -		
Number of outputs - Output voltage (typ) - Output voltage (rated value) -		DC 500 V
Output voltage (typ) - Output voltage (rated value) -	Technical data encoder supply	
Output voltage (rated value) -	Number of outputs	-
	Output voltage (typ)	-
Short-circuit protection -	Output voltage (rated value)	-
· · · · · · · · · · · · · · · · · · ·	Short-circuit protection	-



Binding of potential	-	
Datasizes		
Input bytes	8	
Output bytes	0	
Parameter bytes	32	
Diagnostic bytes	20	
Housing		
Material	PPE / PPE GF10	
Mounting	Profile rail 35 mm	
Mechanical data		
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	
Net weight	61 g	
Weight including accessories	61 g	
Gross weight	75 g	
Environmental conditions		
Operating temperature	0 °C to 60 °C	
Storage temperature	-25 °C to 70 °C	
Certifications		
UL certification	yes	
KC certification	yes	