

## Data sheet

SM 031 (031-1BB10)

## Technical data

Type         SM 031           Module ID         0411 1543           General information	Order no.	031-1BB10
Reatures - Current consumption/power loss  Current consumption/power loss  Current consumption from backplane bus 50 mA Power loss 0,7 W  Technical data analog inputs  Number of inputs 2 Cable length, shelded 200 m Rated load voltage 2 Current consumption from load voltage L+ (without load) 20 mA  Voltage inputs 0,0 mA  Voltage inputs 1,0 main load voltage ranges 1,0 main load voltage 1,0	Туре	SM 031
Note   2 inputs 12Bit Current 420 mA 2 wite 420 mA 3 wite 420 mA 4 wite 420 mA	Module ID	0411 1543
Note   2 inputs 12Bit Current 420 mA 2 wite 420 mA 3 wite 420 mA 4 wite 420 mA		
Features         2 inputs 12Bit Current 420 mA 2 wire           Current consumption/power loss         50 mA           Current consumption from backplane bus         50 mA           Power loss         0.7 W           Technical data analog inputs           Number of inputs         2           Cable length, shielded         200 m           Rated load voltage         DC 24 V           Current consumption from load voltage L+ (without load)         20 mA           Voltage inputs         -           Min. input resistance (voltage range)         -           Input voltage ranges         -           Operational limit of voltage ranges         -           Operational limit of voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Destruction limit voltage         -           Current inputs         yes           Max. input resistance (current range)         60 Ohm           Input current ranges         +4 mA +20 mA           Operational limit of current ranges with SFU         -           Basic error limit current ranges with SFU         -           Bestruction limit current ranges with SFU         -           Destruction limit current inputs (voltage)         max. 24V	General information	
Current consumption/power loss           Current consumption from backplane bus         50 mA           Power loss         0.7 W           Technical data analog inputs           Number of inputs         2           Cable length, shielded         200 m           Rated load voltage         DC 24 V           Current consumption from load voltage L+ (without load)         20 mA           Voltage inputs         -           Min. input resistance (voltage range)         -           Input voltage ranges         -           Operational limit of voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Current inputs         yes           Max. input resistance (current range)         60 Ohm           Input current ranges         +4 mA +20 mA           Operational limit of current ranges with SFU         -           Basic error limit current ranges with SFU         -	Note	-
Current consumption from backplane bus 50 mA Power loss 0.7 W  Technical data analog inputs  Number of inputs 2 Cable length, shielded 200 m Rated load voltage DC 24 V  Current consumption from load voltage L+ (without load) 20 mA  Voltage inputs  Min. input resistance (voltage range) Input voltage ranges Operational limit of voltage ranges with SFU Basic error limit voltage ranges with SFU Destruction limit voltage ranges with SFU Basic error limit vortage ranges with SFU Destruction limit of current range) 60 Ohm Input current ranges + Operational limit of current ranges + Operational limit of current ranges + Operational limit of current ranges with SFU Destruction limit with SFU  Basic error limit with SFU  Basic error limit with SFU  Basic error limit with SFU  Destruction limit resistor ranges with SFU  Basic error limit with SFU  Basic error limit with SFU  Basic error limit with SFU  Destruction limit resistance inputs  Destruction limit resistance inputs  Destruction limit resistance inputs  Destruction limit resistance inputs  Destruction limit with SFU  Destruction limit with SFU  Destruction limit with SFU  De	Features	Current 420 mA
Power loss         0.7 W           Technical data analog inputs           Number of inputs         2           Cable length, shielded         200 m           Rated load voltage         DC 24 V           Current consumption from load voltage L+ (without load)         20 mA           Voltage inputs         -           Min. Input resistance (voltage range)         -           Input voltage ranges         -           Operational limit of voltage ranges         -           Operational limit of voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Destruction limit voltage         -           Current inputs         yes           Max. input resistance (current range)         60 Ohm           Input current ranges         +4 mA +20 mA           Operational limit of current ranges with SFU         -           Operational limit of current ranges with SFU         -           Basic error limit current inputs (voltage)         max. 24V           Destruction limit current inputs (electrical current)         max. 40mA           Resistance ranges         -           Operational limit of resistor ranges with SFU         - </td <td>Current consumption/power loss</td> <td></td>	Current consumption/power loss	
Number of inputs 2 Cable length, shielded 200 m Rated load voltage DC 24 V Current consumption from load voltage L+ (without load) 20 mA Voltage inputs - Min. input resistance (voltage range) - Input voltage ranges - Operational limit of voltage ranges with SFU - Basic error limit voltage ranges with SFU - Destruction limit voltage ranges with SFU - Operational limit of voltage ranges with SFU - Destruction limit voltage ranges with SFU - Operational limit of voltage ranges with SFU - Destruction limit voltage ranges with SFU - Operational limit of current range with SFU - Operational limit of current ranges +4 mA +20 mA on A +20 mA on A +20 mA Operational limit of current ranges with SFU - Operational limit of current ranges with SFU - Operational limit or current ranges with SFU - Operational limit or current ranges with SFU - Operational limit or current ranges with SFU - Operational limit current ranges with SFU - Operational limit or current inputs (voltage) max. 24V Operational limit current inputs (voltage) max. 24V Operational limit or resistor ranges - Operational limit or resistor ranges with SFU -	Current consumption from backplane bus	50 mA
Number of inputs         2           Cable length, shielded         200 m           Rated load voltage         DC 24 V           Current consumption from load voltage L+ (without load)         20 mA           Voltage inputs         -           Min. input resistance (voltage range)         -           Input voltage ranges         -           Operational limit of voltage ranges         -           Operational limit of voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Besic error limit voltage ranges with SFU         -           Destruction limit voltage         -           Current inputs         yes           Max. input resistance (current range)         60 Ohm           Input current ranges         +4 mA +20 mA           Operational limit of current ranges         +/-0.5%           Operational limit of current ranges with SFU         -           Basic error limit current inputs (voltage)         max. 24V           Destruction limit current inputs (electrical current)         max. 40mA           Resistance inputs         -           Resistance ranges         -           Operational limit of resistor ranges with SFU         -           Basic error limit         -	Power loss	0.7 W
Number of inputs         2           Cable length, shielded         200 m           Rated load voltage         DC 24 V           Current consumption from load voltage L+ (without load)         20 mA           Voltage inputs         -           Min. input resistance (voltage range)         -           Input voltage ranges         -           Operational limit of voltage ranges         -           Operational limit of voltage ranges with SFU         -           Basic error limit voltage ranges with SFU         -           Besic error limit voltage ranges with SFU         -           Destruction limit voltage         -           Current inputs         yes           Max. input resistance (current range)         60 Ohm           Input current ranges         +4 mA +20 mA           Operational limit of current ranges         +/-0.5%           Operational limit of current ranges with SFU         -           Basic error limit current inputs (voltage)         max. 24V           Destruction limit current inputs (electrical current)         max. 40mA           Resistance inputs         -           Resistance ranges         -           Operational limit of resistor ranges with SFU         -           Basic error limit         -	Technical data analog inputs	
Cable length, shielded     200 m       Rated load voltage     DC 24 V       Current consumption from load voltage L+ (without load)     20 mA       Voltage inputs     -       Min. input resistance (voltage ranges)     -       Input voltage ranges     -       Operational limit of voltage ranges     -       Operational limit of voltage ranges with SFU     -       Basic error limit voltage ranges with SFU     -       Destruction limit voltage ranges with SFU     -       Destruction limit voltage     -       Current inputs     yes       Max. input resistance (current range)     60 Ohm       Input current ranges     +4 mA +20 mA       Operational limit of current ranges with SFU     -       Destructional limit of current ranges with SFU     -       Basic error limit current ranges with SFU     -       Destruction limit current inputs (voltage)     max. 24V       Destruction limit current inputs (electrical current)     max. 40mA       Resistance ranges     -       Operational limit of resistor ranges with SFU     -       Basic error limit     -       Basic error limit with SFU     -       O		2
Rated load voltage DC 24 V  Current consumption from load voltage L+ (without load) 20 mA  Voltage inputs -  Min. input resistance (voltage range) -  Input voltage ranges -  Operational limit of voltage ranges +  Operational limit of voltage ranges with SFU -  Basic error limit voltage ranges with SFU -  Destruction limit voltage ranges with SFU -  Eurrent inputs yes  Max. input resistance (current range) 60 Ohm  Input current ranges +4 mA+20 mA OmA+20 mA  Operational limit of current ranges with SFU -  Basic error limit current ranges +/-0.5%  Operational limit of current ranges with SFU -  Basic error limit current ranges with SFU -  Bestruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  Resistance inputs -  Resistance ranges -  Operational limit of resistor ranges with SFU -  Basic error limit current inputs (electrical current) max. 40mA  Resistance ranges -  Operational limit of resistor ranges with SFU -  Basic error limit mit resistance inputs -  Operational limit of resistor ranges with SFU -  Basic error limit with SFU -	<u> </u>	
Current consumption from load voltage L+ (without load)  Voltage inputs  - Min. input resistance (voltage range) - Input voltage ranges - Operational limit of voltage ranges - Basic error limit voltage ranges with SFU - Destruction limit voltage ranges with SFU - Destruction limit voltage - Current inputs yes Max. input resistance (current range) 60 Ohm Input current ranges +4 mA+20 mA 0 mA+20 mA 0 mA+20 mA 0 mA+20 mA  Operational limit of current ranges +/-0.5%  Operational limit of current ranges with SFU - Basic error limit current ranges with SFU - Destruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  Resistance ranges - Operational limit of resistor ranges - Operational limit of resistor ranges with SFU - Resistance ranges - Operational limit of resistor ranges with SFU - Basic error limit current ranges with SFU - Basic error limit resistance ranges - Operational limit of resistor ranges with SFU - Basic error limit resistance inputs - Current ranges - Operational limit of resistor ranges with SFU - Basic error limit with SFU - Basic error limit with SFU - Current ranges with SFU - Current ranges - Cur		
Voltage inputs  Min. input resistance (voltage range)  Input voltage ranges  Operational limit of voltage ranges  Operational limit of voltage ranges  Operational limit of voltage ranges  -  Operational limit of voltage ranges with SFU  Basic error limit voltage ranges with SFU  Destruction limit voltage ranges with SFU  Destruction limit voltage  Current inputs  Max. input resistance (current range)  Max. input resistance (current range)  Operational limit of current ranges  +4 mA +20 mA  O mA +20 mA  O mA +20 mA  O perational limit of current ranges with SFU  Basic error limit current ranges with SFU  -  Basic error limit current ranges with SFU  Destruction limit current inputs (voltage)  max. 24V  Destruction limit current inputs (electrical current)  max. 40mA  Resistance ranges  Operational limit of resistor ranges  Operational limit of resistor ranges with SFU  Basic error limit  Basic error limit theresistance inputs  -  Basic error limit resistance inputs  -  Destruction limit resistance inputs		
Min. input resistance (voltage ranges Input voltage ranges - Operational limit of voltage ranges - Operational limit of voltage ranges - Basic error limit voltage ranges with SFU - Basic error limit voltage ranges with SFU - Destruction limit voltage - Current inputs yes Max. input resistance (current range) Input current ranges +4 m A +20 m A 0 m A +20 m		
Input voltage ranges Operational limit of voltage ranges Operational limit of voltage ranges with SFU Basic error limit voltage ranges with SFU Opestruction limit voltage ranges with SFU Opestruction limit voltage Current inputs yes Max. input resistance (current range) Input current ranges  +4 mA +20 mA OmA +20 mA Operational limit of current ranges +/-0.5% Operational limit of current ranges with SFU Basic error limit current ranges with SFU  Destruction limit current inputs (voltage) max. 24V Destruction limit current inputs (electrical current) Resistance inputs Coperational limit of resistor ranges Operational limit of resistor ranges Operational limit current inputs (voltage) max. 40mA Resistance inputs Coperational limit of resistor ranges Operational limit of resistor ranges Operational limit of resistor ranges Operational limit of resistor ranges with SFU Basic error limit Coperational limit of resistor ranges Operational limit of resistor ranges Operational limit of resistor ranges Operational limit of resistor ranges with SFU Sasic error limit Coperational limit of resistor ranges with SFU Coperational limit of range with SFU Coperational limit of range with SFU		-
Operational limit of voltage ranges Operational limit of voltage ranges with SFU Basic error limit voltage ranges with SFU - Basic error limit voltage ranges with SFU - Destruction limit voltage Current inputs yes Max. input resistance (current range) 60 Ohm Input current ranges +4 mA +20 mA 0 mA +20 mA 0 mA +20 mA 0 mA +20 mA 0 perational limit of current ranges +/-0.5% Operational limit of current ranges +/-0.3% Radical error limit current ranges with SFU - Destruction limit current inputs (voltage) max. 24V Destruction limit current inputs (electrical current) max. 40mA Resistance inputs - Coperational limit of resistor ranges - Operational limit of resistor ranges with SFU - Basic error limit current inputs (electrical current) - Coperational limit of resistor ranges - Coperational limit of resistor ranges with SFU - Basic error limit unit of resistor ranges with SFU - Basic error limit for resistor ranges with SFU - Coperational limit of resistor ranges with SFU - Basic error limit for resistor ranges with SFU - Coperational limit of resistor ranges with SFU - Coperational limit with SFU		-
Operational limit of voltage ranges with SFU  Basic error limit voltage ranges  - Basic error limit voltage ranges with SFU  - Destruction limit voltage  - Current inputs  Max. input resistance (current range)  Input current ranges  - Operational limit of current ranges  - Basic error limit current ranges  - Operational limit of current ranges  +/-0.5%  Operational limit of current ranges with SFU  - Basic error limit current ranges with SFU  - Destruction limit current inputs (voltage)  max. 24V  Destruction limit current inputs (electrical current)  Resistance inputs  Resistance ranges  - Operational limit of resistor ranges with SFU  - Basic error limit current inputs (electrical current)  - Destruction limit current inputs (electrical current)  - Destruction limit of resistor ranges  - Operational limit of resistor ranges with SFU  - Basic error limit  - Basic error limit with SFU  - Destruction limit tresistance inputs  - Current		-
Basic error limit voltage ranges -  Basic error limit voltage ranges with SFU -  Destruction limit voltage -  Current inputs yes  Max. input resistance (current range) 60 Ohm  Input current ranges +4 MA +20 MA O mA		-
Destruction limit voltage  Current inputs  Max. input resistance (current range)  Input current ranges  +4 mA +20 mA 0 mA +20 mA 0 mA +20 mA Operational limit of current ranges  +/-0.5%  Operational limit of current ranges with SFU  Basic error limit current ranges with SFU  -  Destruction limit current inputs (voltage)  Destruction limit current inputs (voltage)  max. 24V  Destruction limit current inputs (electrical current)  Resistance inputs  -  Operational limit of resistor ranges  -  Operational limit of resistor ranges  -  Operational limit of resistor ranges with SFU  -  Basic error limit  -  Basic error limit  -  Destruction limit resistance inputs  -  -  Destruction limit resistance with SFU  -  Basic error limit  -  Basic error limit with SFU  -  Destruction limit resistance inputs  -  -  -  Destruction limit resistance inputs		-
Destruction limit voltage  Current inputs  Max. input resistance (current range)  Input current ranges  +4 mA +20 mA 0 mA +20 mA 0 mA +20 mA Operational limit of current ranges  +/-0.5%  Operational limit of current ranges with SFU  Basic error limit current ranges with SFU  -  Destruction limit current inputs (voltage)  Destruction limit current inputs (voltage)  max. 24V  Destruction limit current inputs (electrical current)  Resistance inputs  -  Operational limit of resistor ranges  -  Operational limit of resistor ranges  -  Operational limit of resistor ranges with SFU  -  Basic error limit  -  Basic error limit  -  Destruction limit resistance inputs  -  -  Destruction limit resistance with SFU  -  Basic error limit  -  Basic error limit with SFU  -  Destruction limit resistance inputs  -  -  -  Destruction limit resistance inputs	Basic error limit voltage ranges with SFU	-
Max. input resistance (current range)  Input current ranges  +4 mA +20 mA 0 mA +20 mA 0 mA +20 mA  Operational limit of current ranges  +/-0.5%  Operational limit of current ranges with SFU  - Basic error limit current ranges with SFU  - Destruction limit current inputs (voltage)  Destruction limit current inputs (electrical current)  Resistance inputs  - Coperational limit of resistor ranges  - Operational limit of resistor ranges with SFU  - Basic error limit current inputs (voltage)  - Coperational limit of resistor ranges  - Coperational limit of resistor ranges  - Coperational limit of resistor ranges with SFU  - Basic error limit  - Basic error limit with SFU  - Destruction limit resistance inputs  - Coperational limit resistance inputs		-
Input current ranges	Current inputs	yes
Operational limit of current ranges +/-0.5%  Operational limit of current ranges with SFU -  Basic error limit current ranges with SFU -  Destruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  Resistance inputs -  Coperational limit of resistor ranges with SFU -  Destructional limit of resistor ranges -  Operational limit of resistor ranges with SFU -  Basic error limit -  Basic error limit -  Destruction limit of resistance inputs -  -  Destructional limit of resistor ranges with SFU -  Basic error limit -  Destruction limit resistance inputs -	Max. input resistance (current range)	60 Ohm
Operational limit of current ranges with SFU - Basic error limit current ranges +/-0.3% Radical error limit current ranges with SFU - Destruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  Resistance inputs - Resistance ranges - Operational limit of resistor ranges with SFU - Basic error limit - Basic error limit with SFU - Destruction limit resistance inputs -	Input current ranges	
Basic error limit current ranges +/-0.3%  Radical error limit current ranges with SFU -  Destruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  Resistance inputs -  Resistance ranges -  Operational limit of resistor ranges inputs -  Destructional limit of resistor ranges with SFU -  Basic error limit -  Basic error limit with SFU -  Destruction limit resistance inputs -	Operational limit of current ranges	+/-0.5%
Radical error limit current ranges with SFU  Destruction limit current inputs (voltage)  max. 24V  Destruction limit current inputs (electrical current)  Resistance inputs  Resistance ranges  - Operational limit of resistor ranges with SFU  Basic error limit  Destruction limit resistance inputs  - Destruction limit resistance inputs  - Destruction limit resistance inputs  -  -  -  -  -  -  -  -  -  -  -  -  -	Operational limit of current ranges with SFU	-
Destruction limit current inputs (voltage) max. 24V  Destruction limit current inputs (electrical current) max. 40mA  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 -	Basic error limit current ranges	+/-0.3%
Destruction limit current inputs (electrical current) max. 40mA  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 -	Radical error limit current ranges with SFU	-
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 -	Destruction limit current inputs (voltage)	max. 24V
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 -	Destruction limit current inputs (electrical current)	max. 40mA
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 inputs	-
Operational limit of resistor ranges with SFU -  Basic error limit -  Basic error limit with SFU -  Destruction limit resistance inputs -	Resistance ranges	-
Basic error limit  Basic error limit with SFU  Destruction limit resistance inputs  -	Operational limit of resistor ranges	-
Basic error limit with SFU -  Destruction limit resistance inputs -	Operational limit of resistor ranges with SFU	-
Destruction limit resistance inputs -	Basic error limit	-
	Basic error limit with SFU	-
Resistance thermometer inputs -	Destruction limit resistance inputs	-
Trestation transfer inpute	Resistance thermometer inputs	-



Resistance thermometer ranges	. A YASKAWA COMPANY
Operational limit of resistance thermometer ranges	-
Operational limit of resistance thermometer ranges with SFU	
Basic error limit thermoresistor ranges	
Grundfehlergrenze Widerstandsthermometerbereiche mit SFU	-
Destruction limit resistance thermometer inputs	
Thermocouple inputs	
Thermocouple ranges	-
Operational limit of thermocouple ranges	-
Operational limit of thermocouple ranges with SFU	-
Basic error limit thermoelement ranges	-
Basic error limit thermoelement ranges with SFU	-
Destruction limit thermocouple inputs	-
Programmable temperature compensation	-
External temperature compensation	-
Internal temperature compensation	-
Internal temperature compensation	
Technical unit of temperature measurement	-
Resolution in bit	12
Measurement principle	successive approximation
Basic conversion time	1.15 ms all channels
Noise suppression for frequency	>80dB (UCM<20V)
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	green LED
Module error display	red LED
Channel error display	red LED per channel
Isolation	
Between channels	yes
Between channels of groups to	1
Between channels and backplane bus	yes
Between channels and power supply	yes
Max. potential difference between circuits	DC 75 V/ AC 50 V
Max. potential difference between inputs (Ucm)	DC 75 V/ AC 50 V
Max. potential difference between Mana and Mintern (Uiso)	-
Max. potential difference between inputs and Mana (Ucm)	DC 75 V/ AC 50 V
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
Datasizes	
Input bytes	4
Output bytes	0

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Parameter bytes	20	A YASKAWA COMPANY		
Diagnostic bytes	20			
Housing				
Material	PPE / PPE GF10			
Mounting	Profile rail 35 mm			
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x	12.9 mm x 109 mm x 76.5 mm		
Weight	60 g	60 g		
Environmental conditions				
Operating temperature	0 °C to 60 °C			
Storage temperature	-25 °C to 70 °C			
Certifications				
UL certification	yes			
KC certification	yes			