

## Data sheet

SM 031 (031-1CA20)

## Technical data

Resolution in bit  24  Measurement principle  Basic conversion time  Input filter Hardware  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  Didid differential voltage SIG  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  possible bridge configuration  max. 90mA-12V / max. 80mA  24  Measurement principle successive approximation  1ms cycle, 10ms330ms depending on the filter  Low pass 10kHz 3rd order  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  012V  Bridge differential voltage SIG  4/-29mV  Rated output  9.54mV/V  4 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  Housing	Order no.	031-1CA20	
Pattures   Direct connection of a resistor full bridge (DMS) or load cell 4- or 6-wire connection of a resistor full bridge (DMS) or load cell 4- or 6-wire connection of a resistor full bridge (DMS) or load cell 4- or 6-wire connection and final value Autobalf calibration zero point and final value Autobalf calibration zero point and final value Autobalf calibration zero of 1% (e. 0.01%) Onboard power supply 2V5, 5V, 7V5, 10V and 12V    Technical data strain gauge DMS	Туре	SM 031	
Peatures	Module ID	0841 1809	
Peatures	Company information		
Features    Direct connection of a resistor full bridge (DMS) or load cell 4- or 8-wire connection (24)- or 8-wire connection (24			
4- or 6-wire connection 16 (24)Bit resolution Auto'self calibration zero point and final value Absolute exactness radical error ±0,1% (± 0,01%) Onboard power supply 2V5, 5V, 7V5, 10V and 12V  Technical data strain gauge DMS  Number of inputs 1 Cable length, shielded 200 Retength, shielded 200 Reverse polarity protection of rated load voltage yes Current consumption from load voltage L+ (without load) 85 Relative accuracy according to self-calibration 4/-0.01% Poperational limit Usense 4/-0.2% Poperational limit Usense 4/-0.2% Basic error limit Usense 4/-0.1% Basic error limit Usig 4/-0.1% Basic error limit voltage External bridge supply possible yes  Configurable bridge supply 2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 90mA-12V / max. 90mA-10V max. 90mA-12V / max. 90mA-10V max. 90mA-		<u>-</u>	
Number of inputs 1 Cable length, shielded 200 Rated load voltage DC 24 V Reverse polarity protection of rated load voltage yes Current consumption from load voltage L+ (without load) 85 Relative accuracy according to self-calibration +/-0.01% Operational limit Usense +/-0.2% Operational limit Usense +/-0.1% Basic error limit Usense +/-0.1% Basic error limit Usense +/-0.1% Basic error limit Usig -/-0.2% Configurable bridge supply possible Ves Configurable bridge supply possible Ves Configurable bridge supply 2.5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA Resolution in bit 24 Measurement principle successive approximation Basic conversion time 1 ms cycle, 10ms330ms depending on the filter Input filter Hardware Low pass 10kHz 3rd order Input filter software Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz Initial data size 4 Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V Bridge differential voltage SIG +/-29mV Rated output 0.54mV/V 4 wire connection possible yes 6 wire connection possible yes possible bridge configuration symmetric full bridge Housing	Features	4- or 6-wire connection 16 (24)Bit resolution Auto/self calibration zero point and final value Absolute exactness radical error ±0,1% (± 0,01%)	
Cable length, shielded 200 Rated load voltage DC 24 V Reverse polarity protection of rated load voltage yes Current consumption from load voltage L+ (without load) 85 Relative accuracy according to self-calibration +/-0.01% Operational limit Usense +/-0.2% Operational limit Using +/-0.2% Basic error limit Using +/-0.1% Basic error limit Using +/-0.1% Basic error limit Using max. 12V External bridge supply possible -  Configurable bridge supply possible -  Configurable bridge supply 2,5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA Resolution in bit 24 Measurement principle successive approximation Basic conversion time 1 ms cycle, 10ms330ms depending on the filter Input filter Hardware Low pass 10kHz 3rd order Input filter software Dynamic IIR filter -0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V Bridge differential voltage SIG +/-29mV Rated output 0.54mV/V 4 wire connection possible yes 6 wire connection possible yes 9 ossible bridge configuration symmetric full bridge Housing	Technical data strain gauge DMS		
Rated load voltage DC 24 V  Reverse polarity protection of rated load voltage yes  Current consumption from load voltage L+ (without load) 85  Relative accuracy according to self-calibration +/-0.01%  Operational limit Usense +/-0.2%  Operational limit Usense +/-0.2%  Destruction limit Usig +/-0.2%  Basic error limit Usense +/-0.1%  Basic error limit Usig +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply possible  Ves  Configurable bridge supply supply  Configurable bridge supply  Successive approximation  Basic conversion time  Input filter Hardware  Input filter software  Dynamic IIR filter-configurable IIR filter 50Hz/60Hz  Initial data size  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  Bridge fifter software  Bridge fifterential voltage SIG  Rated output  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration  Symmetric full bridge  Housing	Number of inputs	1	
Reverse polarity protection of rated load voltage yes  Current consumption from load voltage L+ (without load) 85  Relative accuracy according to self-calibration +/-0.01%  Operational limit Usense +/-0.2%  Operational limit Usense +/-0.2%  Basic error limit Usense +/-0.1%  Basic error limit Usig +/-0.1%  Basic error limit Usig +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply possible -  Configurable bridge supply accessive approximation successive approximation successive approximation successive approximation assic conversion time through the randware low pass 10kHz 3rd order longut filter Foftware Dynamic IIR filter configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge supply voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Cable length, shielded	200	
Current consumption from load voltage L+ (without load)  Relative accuracy according to self-calibration +/-0.01%  Operational limit Usense +/-0.2%  Operational limit Using +/-0.2%  Basic error limit Usense +/-0.1%  Basic error limit Using +/-0.1%  Basic error limit Using +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply \$2.5V \ max. 120mA-5V \ max. 120mA-7.5V \ max. 100mA-10V max. 90mA-12V \ max. 80mA  Resolution in bit 24  Measurement principle successive approximation  Basic conversion time 1ms cycle, 10ms330ms depending on the filter limput filter Hardware Low pass 10kHz 3rd order  Input filter software Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Rated load voltage	DC 24 V	
Relative accuracy according to self-calibration +/-0.01%  Operational limit Usense +/-0.2%  Operational limit Usig +/-0.2%  Basic error limit Usense +/-0.1%  Basic error limit Usig +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply \$2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit 24  Measurement principle successive approximation  Basic conversion time 1 ms cycle, 10ms330ms depending on the filter  Input filter Hardware Low pass 10kHz 3rd order  Input filter software Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Reverse polarity protection of rated load voltage	yes	
Operational limit Usense +/-0.2% Operational limit Usig +/-0.2% Basic error limit Usense +/-0.1% Basic error limit Usig +/-0.1% Destruction limit voltage max. 12V External bridge supply possible -  Configurable bridge supply Possible -  Configurable bridge supply 2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA Resolution in bit 24 Measurement principle successive approximation Basic conversion time 1ms cycle, 10ms330ms depending on the filter Input filter Hardware Low pass 10kHz 3rd order Input filter software Dynamic IIR filter-configurable IIR filter 50Hz/60Hz Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V Bridge differential voltage SIG +/-29mV Rated output 0.54mV/V 4 wire connection possible yes 6 wire connection possible yes possible bridge configuration symmetric full bridge  Housing	Current consumption from load voltage L+ (without load)	85	
Operational limit Usig	Relative accuracy according to self-calibration	+/-0.01%	
Basic error limit Usense +/-0.1% Basic error limit Usig +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply possible -  Configurable bridge supply 2,5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit 24  Measurement principle successive approximation  Basic conversion time 1ms cycle, 10ms330ms depending on the filter  Input filter Hardware Low pass 10kHz 3rd order  Input filter software Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge	Operational limit Usense	+/-0.2%	
Basic error limit Usig +/-0.1%  Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply 2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit 24  Measurement principle successive approximation  Basic conversion time 1ms cycle, 10ms330ms depending on the filter Input filter Hardware Low pass 10kHz 3rd order  Input filter software Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge	Operational limit Usig	+/-0.2%	
Destruction limit voltage max. 12V  External bridge supply possible -  Configurable bridge supply 2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit 24  Measurement principle successive approximation  Basic conversion time 1ms cycle, 10ms330ms depending on the filter  Input filter Hardware Low pass 10kHz 3rd order  Input filter software Dynamic IIR filter-configurable IIR filter fo.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size 4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC 012V  Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Basic error limit Usense	+/-0.1%	
External bridge supply possible  yes  Configurable bridge supply  2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit  24  Measurement principle  Basic conversion time  1ms cycle, 10ms330ms depending on the filter  Input filter Hardware  Low pass 10kHz 3rd order  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  D12V  Bridge differential voltage SIG  #/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  yes  symmetric full bridge  Housing	Basic error limit Usig	+/-0.1%	
Ves  Configurable bridge supply  2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit  24  Measurement principle  Basic conversion time  Ims cycle, 10ms330ms depending on the filter  Input filter Hardware  Low pass 10kHz 3rd order  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  012V  Bridge differential voltage SIG  4-/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  symmetric full bridge  Housing	Destruction limit voltage	max. 12V	
Configurable bridge supply  2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V max. 90mA-12V / max. 80mA  Resolution in bit  24  Measurement principle  Basic conversion time  1ms cycle, 10ms330ms depending on the filter  Input filter Hardware  Low pass 10kHz 3rd order  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  012V  Bridge differential voltage SIG  +/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  Symmetric full bridge  Housing	External bridge supply possible	-	
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Measurement principle  Basic conversion time  1ms cycle, 10ms330ms depending on the filter  Input filter Hardware  Low pass 10kHz 3rd order  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  D:12V  Bridge differential voltage SIG  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  possible bridge configuration  symmetric full bridge  Housing	Configurable bridge supply	2.5V / max. 120mA-5V / max. 120mA-7.5V / max. 100mA-10V / max. 90mA-12V / max. 80mA	
Basic conversion time  Input filter Hardware  Low pass 10kHz 3rd order  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  012V  Bridge differential voltage SIG  +/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  symmetric full bridge  Housing	Resolution in bit	24	
Input filter Hardware  Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  Bridge differential voltage SIG  4/-29mV  Rated output  0.54mV/V  4 wire connection possible  5 wire connection possible  yes  6 wire connection possible  yes  possible bridge configuration  Symmetric full bridge  Housing	Measurement principle	successive approximation	
Input filter software  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable FIR filter 50Hz/60Hz  Initial data size  4  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  Bridge differential voltage SIG  A/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  possible bridge configuration  Dynamic IIR filter-configurable IIR filter 0.1Hz1000Hz-configurable	Basic conversion time	1ms cycle, 10ms330ms depending on the filter	
Initial data size  Data for selection of the strain gauge DMS sensor  Bridge supply voltage EXC  Didge differential voltage SIG  Rated output  Very service of the strain gauge DMS sensor  Didge differential voltage SIG  H/-29mV  A wire connection possible  Very service on possible  Very symmetric full bridge  Housing	Input filter Hardware	Low pass 10kHz 3rd order	
Bridge supply voltage EXC  D12V  Bridge differential voltage SIG  Rated output  Very supply voltage EXC  D12V  Bridge differential voltage SIG  H/-29mV  A wire connection possible  Very supply voltage EXC  Very supply voltage EXC  D12V  D.54mV/V  Very supply voltage EXC  Very supply	Input filter software		
Bridge supply voltage EXC  Bridge differential voltage SIG  +/-29mV  Rated output  0.54mV/V  4 wire connection possible  yes  6 wire connection possible  possible bridge configuration  yes  Housing	Initial data size	4	
Bridge differential voltage SIG +/-29mV  Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Data for selection of the strain gauge DMS sensor		
Rated output 0.54mV/V  4 wire connection possible yes  6 wire connection possible yes  possible bridge configuration symmetric full bridge  Housing	Bridge supply voltage EXC	012V	
4 wire connection possible yes 6 wire connection possible yes possible bridge configuration symmetric full bridge  Housing	Bridge differential voltage SIG	+/-29mV	
6 wire connection possible yes possible bridge configuration symmetric full bridge  Housing	Rated output	0.54mV/V	
possible bridge configuration symmetric full bridge  Housing	4 wire connection possible	yes	
Housing	6 wire connection possible	yes	
	possible bridge configuration	symmetric full bridge	
M	Housing		
Material PC / PPE GF10	Material	PC / PPE GF10	



Mounting	Profile rail 35 mm	A YASKAWA COMPANY	
Mechanical data			
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm		
Weight	60 g		
Environmental conditions			
Operating temperature	0 °C to 60 °C		
Storage temperature	-25 °C to 70 °C		
Certifications			
UL certification	in preparation		
KC certification	in preparation		