

## Data sheet

SM 231 (231-1BD53)

## Technical data

Order no.	231-1BD53	
Туре	SM 231	
General information		
Note	-	
Features	4 inputs Configurable Voltage, current Resistance Resistance thermometer, thermocouple	
Current consumption/power loss		
Current consumption from backplane bus	280 mA	
Power loss	1.4 W	
Technical data analog inputs		
Number of inputs	4	
Cable length, shielded	200 m	
Rated load voltage	-	
Current consumption from load voltage L+ (without load)	nout load) -	
Voltage inputs	✓	
Min. input resistance (voltage range)	20 MOhm	
Input voltage ranges	-50 mV +50 mV -400 mV +400 mV -4 V +4 V -10 V +10 V	
Operational limit of voltage ranges	+/-0.3% +/-0.6%	
Operational limit of voltage ranges with SFU	-	
Basic error limit voltage ranges	+/-0.2% +/-0.4%	
Basic error limit voltage ranges with SFU	-	
Destruction limit current	-	
Current inputs	✓	
Max. input resistance (current range)	85 Ohm	
Input current ranges	-20 mA +20 mA 0 mA +20 mA +4 mA +20 mA	
Operational limit of current ranges	+/-0.3% +/-0.8%	
Operational limit of current ranges with SFU	-	
Radical error limit current ranges with SFU	+/-0.2% +/-0.5%	
Radical error limit current ranges with SFU	-	
Destruction limit current inputs (electrical current)	-	
Destruction limit current inputs (voltage)	-	
Resistance inputs	✓	
Resistance ranges	0 60 Ohm 0 600 Ohm 0 3000 Ohm 0 6000 Ohm	
Operational limit of resistor ranges	+/-0.4% +/-0.8%	



Basic error limit         +/0.2% +/0.4%           Basic roro limit with SFU         -           Debattuction limit resistance inputs         -           Resistance thermometer inputs         -           Resistance thermometer ranges         P100, P11000 KTY91-152 N100, N11000 C450 KTY91-152 N100, N11000 C450 KTY91-120 KTY91-121	Operational limit of resistor ranges with SFU	A YASKAWA COMPANY
Destruction limit resistance inputs  Resistance thermometer ranges  Poperational limit of resistance thermometer ranges  Poperational limit of resistance thermometer ranges with SFU  Resistance resistance thermometer ranges with SFU  Resistance resistance franges with SFU  Resistance ranges  Resi	Basic error limit	+/-0.2% +/-0.4%
Resistance thermometer ranges  #/0.4% +/1.4%  Operational limit of resistance thermometer ranges with SFU  Passic error limit thermoresistor ranges with SFU  Postruction limit resistance thermometer ranges with SFU  Postruction limit define thermoresistor ranges  #/0.2% +/0.7%  Basic error limit thermoresistor ranges with SFU  Poperational limit of thermocouple ranges  #/1.5%  Poperational limit of thermocouple ranges  #/1.5%  Poperational limit of thermocouple ranges with SFU  Postruction limit thermoelement ranges  #/1.0%  Basic error limit thermoelement ranges  #/1.0%  Basic erro	Basic error limit with SFU	-
Resistance thermometer ranges  P100, Pt1000 KTY81-132 N100, N1000 KTY81-1410 KTY81-1410 KTY81-121 KTY81-121 KTY81-122 KTY81-122 KTY81-123 KTY81-123 KTY81-123 KTY81-123 KTY81-123 KTY81-124 KTY81-121 KTY81-12	Destruction limit resistance inputs	
KTY81-152 N100. N1000 Cu50 N100. N1000 Cu50 NTY81-120 KTY81-120 KTY81-120 KTY81-121 KTY81-120 KTY81-121 KTY81-120 KTY81-121 KTY81-120 KTY81-121 KTY81-120 KTY81-121 KTY81-120 KTY81-120 KTY81-121 KTY81-120 KT	Resistance thermometer inputs	✓
Operational limit of resistance thermometer ranges with SFU - Basic error limit thermoresistor ranges with SFU - Destruction limit resistance thermometer inputs - Thermocouple inputs	Resistance thermometer ranges	KTY81-152 Ni100, Ni1000 Cu50 KTY81-110 KTY81-120 KTY81-121 KTY81-122 KTY81-150
Basic error limit thermoresistor ranges with SFU -  Destructional limit of thermocouple ranges with SFU -  Destructional limit thermocouple ranges with SFU -  Destructional limit of thermocouple ranges with SFU -  Destruction limit thermocouple inputs -  Programmable temperature compensation -  External temperature measurement -  Resolution in bit 16  Measurement principle -  Basic corror infrictle  Basic corror fire measurement -  Resolution in bit 16  Measurement principle -  Sigma-Delta -  Basic corror frequency -  none -  Initial data size -  Status display -  Process alarm -  Diagnostic interrupt -  Diagnostic information read-out -  Supply voltage display -  Group error display -  Resolution one -  Diagnostics information read-out -  Supply voltage display -  Resolution one -  Diagnostic information read-out -  Dose -  Diagnostic information read-out -  Dose -  Supply voltage display -  Resolution -  Diagnostic information read-out -  Dose -  Supply voltage display -  Dose -  Diagnostic information read-out -  Dose -  Dose -  Diagnostic information read-out -  Dose -	Operational limit of resistance thermometer ranges	+/-0.4% +/-1.4%
Basic error limit thermoresistor ranges with SFU - Destruction limit resistance thermometer inputs - Thermocouple inputs	Operational limit of resistance thermometer ranges with SFU	-
Destruction limit resistance thermometer inputs Thermocouple inputs  Thermocouple ranges  type J type N type N type N type N type S type E type T  Operational limit of thermocouple ranges  */-1.5%  Operational limit of thermocouple ranges  */-1.5%  Operational limit of thermocouple ranges  */-1.0%  Basic error limit thermoelement ranges with SFU  Destruction limit thermoelement ranges with SFU  Destruction limit thermocouple inputs  Frogrammable temperature compensation  External temperature compensation  Internal temperature compensation  Internal temperature compensation  SF K  Technical unit of temperature measurement  Resolution in bit  Measurement principle  Sigma-Delta  Basic conversion time  7 ms 272 ms  Noise suppression for frequency  none  Intitud data size  8 Byte  Status information, alarms, diagnostics  Status display  none  Interrupts  yes  Process alarm  Diagnostic interrupt  Diagnostic interr	Basic error limit thermoresistor ranges	+/-0.2% +/-0.7%
Thermocouple inputs  Thermocouple ranges  Vipe J Vipe K Vipe R Vipe R Vipe R Vipe E Vipe E Vipe E Vipe E Vipe E Vipe E Vipe T Vipe R Vipe B Vipe E Vide Vipe E Vipe E Vide Vipe E Vipe E Vide Vide Vipe E Vide Vide Vide Vide Vide Vide Vide Vide	Basic error limit thermoresistor ranges with SFU	•
Thermocouple ranges    Vype J   Vype K	Destruction limit resistance thermometer inputs	-
type K type N type R type S type E type T  Operational limit of thermocouple ranges    -/-1.5%  Operational limit of thermocouple ranges with SFU    Basic error limit thermoclement ranges    -/-1.0%  Basic error limit thermoclement ranges    -/-1.0%  Basic error limit thermocouple inputs     Destruction limit thermocouple inputs     Programmable temperature compensation    External temperature compensation    Internal temperature compensation    Internal temperature compensation    SEX    Technical unit of temperature measurement     Resolution in bit    Measurement principle    Sigma-Delta    Basic conversion time    Noise suppression for frequency    Indial data size    Status display    Innernation, alarms, diagnostics    Status display    Process alarm    Diagnostic functions    yes    Diagnostic interrupt    Diagnostic interrupt    Diagnostics information read-out    Supply voltage display    none    Group error display    None    G	Thermocouple inputs	✓
Operational limit of thermocouple ranges with SFU - Basic error limit thermoelement ranges +/-1.0%  Basic error limit thermoelement ranges with SFU - Destruction limit thermocouple inputs - Programmable temperature compensation	Thermocouple ranges	type K type N type R type S type E
Basic error limit thermoelement ranges	Operational limit of thermocouple ranges	+/-1.5%
Basic error limit thermoelement ranges with SFU  Destruction limit thermocouple inputs  Programmable temperature compensation  External temperature compensation  Internal temperature measurement  Internal temperature compensation  Internal temperature demperature dempera	Operational limit of thermocouple ranges with SFU	-
Programmable temperature compensation  External temperature compensation  External temperature compensation  Internal temperature measurement  Internal temperature measurement  Internal temperature measurement  Internal temperature measurement  Internal temperature compensation  Internal temperature compensation  Internal temperature measurement  Internation in bit  Internation in one  Internation in alarms, diagnostics  Status information, alarms, diagnostics  Status information, alarms, diagnostics  Status display  Internation in one  Internation internation internation  I	Basic error limit thermoelement ranges	+/-1.0%
Programmable temperature compensation  External temperature compensation  Internal tem	Basic error limit thermoelement ranges with SFU	•
External temperature compensation Internal temperature compensation Intern	Destruction limit thermocouple inputs	•
Internal temperature compensation  Internal temperature compensation  5 K  Technical unit of temperature measurement  Resolution in bit  16  Measurement principle  Basic conversion time  7 ms 272 ms  Noise suppression for frequency  none  Initial data size  8 Byte  Status information, alarms, diagnostics  Status display  none  Interrupts  yes  Process alarm  no  Diagnostic interrupt  Diagnostic functions  Diagnostics information read-out  Diagnostics information read-out  Supply voltage display  none  Group error display  none	Programmable temperature compensation	✓
Internal temperature compensation 5 K  Technical unit of temperature measurement -  Resolution in bit 16  Measurement principle Sigma-Delta  Basic conversion time 7 ms 272 ms  Noise suppression for frequency none  Initial data size 8 Byte  Status information, alarms, diagnostics  Status display none  Interrupts yes  Process alarm no  Diagnostic interrupt yes, parameterizable  Diagnostic functions yes  Diagnostics information read-out possible  Supply voltage display none  Group error display none	External temperature compensation	✓
Technical unit of temperature measurement  Resolution in bit  Measurement principle  Basic conversion time  7 ms 272 ms  Noise suppression for frequency  none  Initial data size  8 Byte  Status information, alarms, diagnostics  Status display  none  Interrupts  Process alarm  no  Diagnostic interrupt  Diagnostic functions  Diagnostic functions  Diagnostics information read-out  Supply voltage display  none  Group error display  none	Internal temperature compensation	✓
Resolution in bit  Measurement principle  Basic conversion time  7 ms 272 ms  Noise suppression for frequency Initial data size  8 Byte  Status information, alarms, diagnostics  Status display  Interrupts  Process alarm  Diagnostic interrupt  Diagnostic functions  Diagnostics information read-out  Diagnostics information read-out  Supply voltage display  none  Group error display  none	Internal temperature compensation	5 K
Measurement principle Basic conversion time 7 ms 272 ms Noise suppression for frequency none Initial data size 8 Byte  Status information, alarms, diagnostics Status display none Interrupts yes Process alarm no Diagnostic interrupt Diagnostic functions yes Diagnostics information read-out Supply voltage display none Group error display none	Technical unit of temperature measurement	-
Basic conversion time 7 ms 272 ms  Noise suppression for frequency none  Initial data size 8 Byte  Status information, alarms, diagnostics  Status display none  Interrupts yes  Process alarm no  Diagnostic interrupt yes, parameterizable  Diagnostic functions yes  Diagnostics information read-out possible  Supply voltage display none  Group error display none	Resolution in bit	16
Noise suppression for frequency Initial data size  Status information, alarms, diagnostics  Status display Interrupts Process alarm Incerrupts Process alarm Incerrupt Interrupt Interrupt Interrupt Interrupt Interrupt Interrupt Interrupt Incerrupt	Measurement principle	Sigma-Delta
Status information, alarms, diagnostics  Status display none Interrupts yes Process alarm no Diagnostic interrupt yes, parameterizable Diagnostic functions yes Diagnostics information read-out possible Supply voltage display none Group error display none	Basic conversion time	7 ms 272 ms
Status information, alarms, diagnostics  Status display none Interrupts yes  Process alarm no Diagnostic interrupt yes, parameterizable Diagnostic functions yes Diagnostics information read-out possible Supply voltage display none Group error display none	Noise suppression for frequency	none
Status display none Interrupts yes Process alarm no Diagnostic interrupt yes, parameterizable Diagnostic functions yes Diagnostics information read-out possible Supply voltage display none Group error display none	Initial data size	8 Byte
Interrupts yes Process alarm no Diagnostic interrupt yes, parameterizable Diagnostic functions yes Diagnostics information read-out possible Supply voltage display none Group error display none	Status information, alarms, diagnostics	
Process alarm no  Diagnostic interrupt yes, parameterizable  Diagnostic functions yes  Diagnostics information read-out possible  Supply voltage display none  Group error display none	Status display	none
Diagnostic interrupt yes, parameterizable  Diagnostic functions yes  Diagnostics information read-out possible  Supply voltage display none  Group error display none	Interrupts	yes
Diagnostic functions yes  Diagnostics information read-out possible  Supply voltage display none  Group error display none	Process alarm	no
Diagnostics information read-out possible Supply voltage display none Group error display none	Diagnostic interrupt	yes, parameterizable
Supply voltage display none Group error display none	Diagnostic functions	yes
Group error display none	Diagnostics information read-out	possible
	Supply voltage display	none
Channel error display red LED per channel	Group error display	none
	Channel 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 circuits	-	
Max. potential difference between inputs (Ucm)	DC 4 V	
Max. potential difference between Mana and Mintern (Uiso)	-	
Max. potential difference between inputs and Mana (Ucm)	-	
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	
Max. potential difference between Mintern and outputs	-	
Insulation tested with	DC 500 V	
Datasizes		
Input bytes	8	
Output bytes	0	
Parameter bytes	12	
Diagnostic bytes	12	
Housing		
Material	PPE / PA 6.6	
Mounting	Profile rail 35 mm	
Mechanical data		
Dimensions (WxHxD)	25.4 mm x 76 mm x 88 mm	
Weight	100 g	
Environmental conditions		
Operating temperature	0 °C to 60 °C	
Storage temperature	-25 °C to 70 °C	
Certifications		
UL508 certification	yes	