





# Analog input modules

## Signal modules analog | Analog input modules

231-1BD30  
231-1BD40  
231-1BD53  
231-1BD60

231-1BD70  
231-1BF00  
231-1FD00

Order number	231-1BD30	231-1BD40	231-1BD53	231-1BD60
Figure				
Type	SM 231, AI 4x12Bit U ECO	SM 231, AI 4x12Bit I ECO	SM 231, AI 4x16Bit U, I, R, TC, RTD	SM 231, AI 4x12Bit I
<b>General information</b>				
Note	-	-	-	-
Features	<ul style="list-style-type: none"> <li>▸ 4 inputs,</li> <li>▸ Configurable,</li> <li>▸ Voltage +/-10 V</li> </ul>	<ul style="list-style-type: none"> <li>▸ 4 inputs,</li> <li>▸ Configurable,</li> <li>▸ Current 4...20 mA, +/-20 mA</li> </ul>	<ul style="list-style-type: none"> <li>▸ 4 inputs,</li> <li>▸ Configurable,</li> <li>▸ Voltage, Current,</li> <li>▸ Resistance,</li> <li>▸ Resistance thermo- meter, Thermocouple</li> </ul>	<ul style="list-style-type: none"> <li>▸ 4 inputs,</li> <li>▸ Current 4...20 mA</li> </ul>
<b>Current consumption/power loss</b>				
Current consumption from backplane bus	120 mA	120 mA	280 mA	280 mA
Power loss	0.6 W	0.6 W	1.4 W	1.4 W
<b>Technical data analog inputs</b>				
Number of inputs	4	4	4	4
Cable length, shielded	-	-	-	-
Rated load voltage	-	-	-	-
Current consumption from load voltage L+ (without load)	-	-	-	-
Voltage inputs	✓	-	✓	-
Min. input resistance (voltage range)	100 kΩ	-	20 MΩ	-
Input voltage ranges	-10 V ... +10 V	-	-50 mV ... +50 mV -400 mV ... +400 mV -4 V ... +4 V -10 V ... +10 V	-
Operational limit of voltage ranges	+/-0.2%	-	+/-0.3% ... +/-0.6%	-
Basic error limit voltage ranges	+/-0.1%	-	+/-0.2% ... +/-0.4%	-
Current inputs	-	✓	✓	✓
Min. input resistance (current range)	-	110 Ω	85 Ω	20 Ω
Input current ranges	-	-20 mA ... +20 mA +4 mA ... +20 mA	-20 mA ... +20 mA 0 mA ... +20 mA +4 mA ... +20 mA	+4 mA ... +20 mA
Operational limit of current ranges	-	+/-0.2% ... +/-0.5%	+/-0.3% ... +/-0.8%	-
Basic error limit current ranges	-	+/-0.1% ... +/-0.2%	+/-0.2% ... +/-0.5%	-
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%	-

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231-1BD40	231-1BF00				
231-1BD53	231-1FD00				
231-1BD60					

Order number	231-1BD30	231-1BD40	231-1BD53	231-1BD60
Resistance thermometer inputs	-	-	✓	-
Resistance thermometer ranges	-	-	Pt100, Pt1000 KTY81-152 Ni100, Ni1000 Cu50 KTY81-110 KTY81-120 KTY81-121 KTY81-122 KTY81-150 KTY81-151	-
Operational limit of resistance thermometer ranges	-	-	+/-0.4% ... +/-1.4%	-
Basic error limit thermoresistor ranges	-	-	+/-0.2% ... +/-0.7%	-
Thermocouple inputs	-	-	✓	-
Thermocouple ranges	-	-	type J type K type N type R type S type E type T	-
Operational limit of thermocouple ranges	-	-	+/-1.5%	-
Basic error limit thermoelement ranges	-	-	+/-1.0%	-
Programmable temperature compensation	-	-	✓	-
External temperature compensation	-	-	✓	-
Internal temperature compensation	-	-	✓	-
Resolution in bit	13	13	16	12
Measurement principle	successive approximation	successive approximation	Sigma-Delta	successive approximation
Basic conversion time	2 ms / channel	2 ms / channel	7 ms ... 272 ms	-
Noise suppression for frequency	f=50 Hz...400 Hz	f=50 Hz...400 Hz	none	f=50 Hz / 60 Hz
Initial data size	8 Byte	8 Byte	8 Byte	8 Byte
<b>Status information, alarms, diagnostics</b>				
Status display	none	none	none	none
Interrupts	no	no	yes	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	yes, parameterizable	no
Diagnostic functions	no	no	yes	no
Diagnostics information read-out	none	none	possible	none
Supply voltage display	none	none	none	none
Group error display	red SF LED	red SF LED	none	none
Channel error display	none	none	red LED per channel	red LED per channel
<b>Isolation</b>				
Between channels	-	-	-	✓
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	-	-	-	-
Max. potential difference between circuits	-	-	-	-

Signal modules analog   Analog input modules					
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231-1BD60					

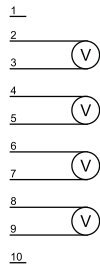
Order number	231-1BD30	231-1BD40	231-1BD53	231-1BD60
Max. potential difference between inputs (Ucm)	DC 2 V	DC 2 V	DC 4 V	DC 500 V
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	-
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
<b>Mechanical data</b>				
Dimensions (WxHxD)	25.4 mm x 76 mm x 88 mm	25.4 mm x 76 mm x 88 mm	25.4 mm x 76 mm x 88 mm	25.4 mm x 76 mm x 88 mm
Weight	90 g	90 g	100 g	100 g
<b>Environmental conditions</b>				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
<b>Certifications</b>				
UL508 certification	yes	yes	yes	yes

# Connections, Interfaces

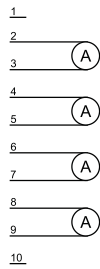
## Signal modules analog | Analog input modules

231-1BD30 231-1BD40 231-1BD53 231-1BD60	231-1BD70 231-1BF00 231-1FD00				
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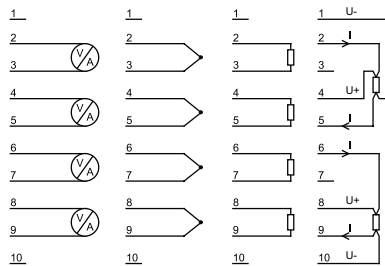
### 231-1BD30



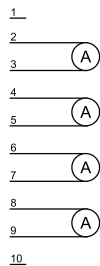
### 231-1BD40



### 231-1BD53



### 231-1BD60






# Analog input modules

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231-1BD30  
231-1BD40  
231-1BD53  
231-1BD60

231-1BD70  
231-1BF00  
231-1FD00

Order number	231-1BD70	231-1BF00	231-1FD00	
Figure				
Type	SM 231, AI 4x12Bit +/-10V	SM 231, AI 8x16Bit (2-wire), AI 4x16Bit (4-wire), U, TC, RTD	SM 231, AI 4x16Bit U, I	
<b>General information</b>				
Note	-	-	-	
Features	<ul style="list-style-type: none"> <li>▸ 4 inputs,</li> <li>▸ Voltage +/-10 V</li> </ul>	<ul style="list-style-type: none"> <li>▸ 8 inputs,</li> <li>▸ Configurable,</li> <li>▸ Voltage 0...60 mV,</li> <li>▸ Resistance thermometer, Thermocouple</li> </ul>	<ul style="list-style-type: none"> <li>▸ 4 fast inputs,</li> <li>▸ Configurable,</li> <li>▸ Voltage, current,</li> <li>▸ Cycle time 0.8 ms</li> </ul>	
<b>Current consumption/power loss</b>				
Current consumption from backplane bus	280 mA	280 mA	300 mA	
Power loss	1.4 W	1.4 W	1.5 W	
<b>Technical data analog inputs</b>				
Number of inputs	4	8	4	
Cable length, shielded	-	-	-	
Rated load voltage	-	-	-	
Current consumption from load voltage L+ (without load)	-	-	-	
Voltage inputs	✓	✓	✓	
Min. input resistance (voltage range)	83 kΩ	2 MΩ	10 MΩ	
Input voltage ranges	-10 V ... +10 V	0 mV ... +60 mV	-400 mV ... +400 mV -4 V ... +4 V -10 V ... +10 V	
Operational limit of voltage ranges	-	-	+/-0.2% ... +/-0.4%	
Basic error limit voltage ranges	-	+/-0.1%	+/-0.1% ... +/-0.3%	
Current inputs	-	-	✓	
Min. input resistance (current range)	-	-	57 Ω	
Input current ranges	-	-	+4 mA ... +20 mA -20 mA ... +20 mA	
Operational limit of current ranges	-	-	+/-0.2% ... +/-0.5%	
Basic error limit current ranges	-	-	+/-0.1% ... +/-0.3%	
Resistance inputs	-	-	-	
Resistance ranges	-	-	-	
Operational limit of resistor ranges	-	-	-	
Basic error limit	-	-	-	
Resistance thermometer inputs	-	✓	-	
Resistance thermometer ranges	-	Pt100	-	
Operational limit of resistance thermometer ranges	-	-	-	

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231-1BD60					

Order number	231-1BD70	231-1BF00	231-1FD00	
Basic error limit thermoresistor ranges	-	±0.15% (2-wire) ±0.15% (4-wire)	-	
Thermocouple inputs	-	✓	-	
Thermocouple ranges	-	type J type K type T	-	
Operational limit of thermocouple ranges	-	-	-	
Basic error limit thermoelement ranges	-	±0.1% (Compensation external) ±1.0% (internal)	-	
Programmable temperature compensation	-	✓	-	
External temperature compensation	-	✓	-	
Internal temperature compensation	-	✓	-	
Resolution in bit	12	16	16	
Measurement principle	successive approximation	Sigma-Delta	successive approximation	
Basic conversion time	-	6,75 ms ... 268 ms	0.2 ms/channel	
Noise suppression for frequency	-	50 Hz and 60 Hz	-	
Initial data size	8 Byte	16 Byte	8 Byte	
<b>Status information, alarms, diagnostics</b>				
Status display	none	none	none	
Interrupts	no	yes	yes	
Process alarm	no	no	yes	
Diagnostic interrupt	no	yes	yes	
Diagnostic functions	no	yes	yes	
Diagnostics information read-out	-	possible	possible	
Supply voltage display	none	none	none	
Group error display	none	red SF LED	none	
Channel error display	none	red LED per channel	red LED per channel	
<b>Isolation</b>				
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 500 V	-	DC 2 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	DC 500 V	DC 500 V	

System SLI0

System 100V

System 200V

System 300S

System 500S

HMI

Software

Accessories

Appendix

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231-1BD30	231-1BD70					
231-1BD40	231-1BF00					
231-1BD53	231-1FD00					
231-1BD60						

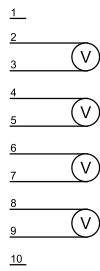
Order number	231-1BD70	231-1BF00	231-1FD00	
<b>Mechanical data</b>				
Dimensions (WxHxD)	25.4 mm x 76 mm x 88 mm	25.4 mm x 76 mm x 88 mm	25.4 mm x 76 mm x 88 mm	
Weight	100 g	90 g	90 g	
<b>Environmental conditions</b>				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	
<b>Certifications</b>				
UL508 certification	yes	yes	yes	

# Connections, Interfaces

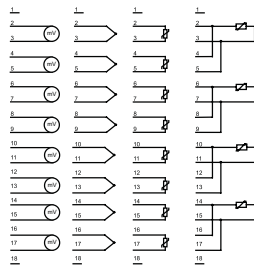
Signal modules analog | Analog input modules

231-1BD30 231-1BD40 231-1BD53 231-1BD60	231-1BD70 231-1BF00 231-1FD00				
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231-1BD70



231-1BF00



231-1FD00

