



DS230 / DS240 series

Safety motion monitor for SinCos and incremental encoders / sensors

- Monitoring underspeed, overspeed, standstill and direction of rotation
- SIL3 and PLe certification
- Safety functions equivalent to EN 61800-5-2 (SS1, SS2, SOS, SLS, SDI, SSM, SLI, SBC, STO, SMS)
- Inputs for:
 - 2 SinCos encoders
 - 2 RS422 incremental encoders
 - 2 HTL / PNP incremental encoders, proximity switches or control signals
- Outputs (safety related):
 - 1 Relay output 5 ... 36 VDC (NO)
 - 1 Analogue output 4 ... 20 mA
 - 4 Control HTL outputs
- Signal splitter (safety related):
 - 1 SinCos Splitter output
 - 1 RS422 Splitter output
- Mounting to 35 mm top hat rail (according to EN 60715)
- USB interface for simple parametrization by the OS operator surface
- Optional available display and programming unit BG200 for parametrization and indication

Technical Specifications:

Power supply:	Input voltage: 18 ... 30 VDC Protective circuit: reverse polarity protection Ripple: max. 10 % at 24 VDC Power consumption: approx. 150 mA (unloaded) Protection: external fuse (2.5 A, medium time-lag) necessary Connections: screw terminal, 1.5 mm ² / AWG 16
Encoder supply:	Number: 2 Output voltage: approx. 2 VDC less the input voltage Output current: max. 200 mA per encoder Protective circuit: short-circuit-proof
SinCos inputs:	Number of inputs: 2 Channels: SIN+, SIN-, COS+, COS- Amplitude: 0.8 ... 1.2 V _{pp} DC offset: 2.4 ... 2.6 VDC Frequency: max. 500 kHz Connections: SUB-D (male), 9-pin
Incremental inputs:	Number of inputs: 2 Format: RS422 (differential signal A, /A, B, /B) Frequency: max. 500 kHz Connections: screw terminal, 1.5 mm ² / AWG 16
Control / incremental inputs:	Number of inputs: 2 (each complementary) Application: connection of HTL encoders, proximity switches, or control commands Signal level: PNP HTL (10 ... 30 V) Load: max. 15 mA Frequency (control): max. 1 kHz Frequency (incremental): max. 250 kHz Connections: screw terminal, 1.5 mm ² / AWG 16

Technical Specifications:		
SinCos output: (safety related)	Splitter output: Channels: Amplitude: DC offset: Frequency: Signal delay: Connector type:	of the SinCos 1 input SIN+, SIN-, COS+, COS- 0.8 ... 1.2 Vpp 2.4 ... 2.6 VDC max. 500 kHz ca. 200 ns SUB-D (female), 9-pin
Incremental output: (safety related)	Splitter output: Format: Frequency: Signal delay: Connections:	of the SinCos 1, SinCos 2, RS422 1, RS422 2 or HTL 1 or HTL 2 input RS422 (differential signals A, /A, B, /B) max. 500 kHz approx. 600 ns screw terminal, 1.5 mm ² / AWG 16
Analogue output: (safety related)	Current output: Resolution: Accuracy: Connections:	4 ... 20 mA (load max. 270 Ohm) 14 Bit ± 0,1% screw terminal, 1.5 mm ² / AWG 16
Control outputs: (safety related)	Number of outputs: Output voltage: Output current: Switching characteristic: Protective circuit: Connections:	4 (each complementary) HTL (approx. 2 VDC less the input voltage) max. 30 mA per output push-pull short-circuit-proof screw terminal, 1.5 mm ² / AWG 16
Relay output: (safety related)	Number of relays: Switching capability: Switching capacity: Connections:	two relays in series with forced-guided contacts (NO) 5 ... 36 VDC 5 mA ... 5 A screw terminal, 1.5 mm ² / AWG 16
USB interface:	Version / connection: Connection: Operating System:	USB 1.0 / Type B (female) X12, USB-B (female) Software DS2xx from version 4c for WIN7 / 8 / 10 (tested with (1511 build 10586.104), otherwise only for WIN7 / 8
LEDs:	Green / yellow:	„ON“ / „ERROR“
Switches:	DIL switch:	1 x 3-pin
Conformity and standards:	MR 2006/42/EU: EMC 2014/30/EU: Vibration resistance: Shock resistance: RoHS (II) 2011/65/EU RoHS (III) 2015/863	EN ISO 13849-1, EN 61508, EN 62061, EN 60947-5-1 EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61326-3-1, EN 61326-3-2 EN 60068-2-6 (sine, 7 g, 10 – 200 Hz, 20 cycles) EN 60068-2-27 (half sine, 30 g, 11 ms, 3 shocks) EN 60068-2-27 (half sine, 17 g, 6 ms, 4000 shocks) EN IEC 63000
Safety characteristic data:	Classification: System structure: System architecture: DC _{in} : SFF: MTTF _c : PFH: $\lambda_1 / \lambda_2 / \lambda_3 / \lambda_4$: Safety functions:	SIL3/PLe (depends on the used encoder input signals) dual-channel Cat. 3 / HFT = 1 97,95 % 98,77 % 38,1 years 3,76 * 10 ⁻⁶ h ⁻¹ 1,93 * 10 ⁻⁶ h ⁻¹ / 4,64 * 10 ⁻⁶ h ⁻¹ / 2,94 * 10 ⁻⁶ h ⁻¹ / 6,14 * 10 ⁻⁶ h ⁻¹ equivalent to EN 61800-5-2 for SS1, SS2, SOS, SLS, SDI, SSM, SLI, SBC, STO, SMS (depending on the used encoder input signals)
Enclosure:	Material: Mounting: Dimensions: Protection class: Weight:	plastic 35 mm top hat rail (according to EN 60715) 50 x 100 x 165 mm (w x h x d) IP20 For proper use, ensure that the device is installed in a housing or control cabinet with a protection class of at least IP54. ca. 390 g
Ambient temperature:	Operation: Storage:	-20 °C ... +55 °C / -4 °F ... +131 °F (without condensation) -25 °C ... +70 °C / -13 °F ... +158 °F (without condensation)
BG200 unit: (optional)	Display / Operation:	OLED-Display / Touch screen
Maintenance:	Interval:	Switch on/off for at least 1 times a year (at continuous operation)
Available devices:	DS230: All inputs and outputs as well as signal splitter function (SinCos- and RS422 output) DS236: All inputs and outputs, but without signal splitter function DS240: 1 SinCos input (SIL3/PLe), 2 control inputs, all outputs as well as signal splitter function (SinCos- / RS422 output) DS246: 1 SinCos input (SIL3/PLe), 2 control inputs, all outputs, but without signal splitter function	