KOSTAL Industrie Elektrik

1 Technical data

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Operating voltage (U_V)	7..18 V_{DC}
Current supply	50 mA
Operating temperature	-20..+70°C (U_V = 11..18 V_{DC}) -20..+80°C (U_V = 7..10 V_{DC})
Interface description	RS485; asynchronous; half duplex Start bit: 1 Data bit: 8 Stop bit: 1 Parity: even
Transfer rate	9,600 or 19,200 baud
Performance after power-up	Ready for operation after max. 50 ms
Covered range	Single turn 360°
Resolution	11 bit; 2,048 steps 0.176°/step
Output data via the respond telegram	The resolution of 2,048 steps will be displayed within the value area of 0..8,191
Mechanical interface	Half-moon (see drawing)
Protection class	IP20
Electrical connection	1: Safety chain input 2: RS 485 B 3: GND 4: RS 485 A 5: Safety chain output 6: U_V = 7..18 V_{DC} 7-12: Three connection possibilities for safety elements (safety chain)
Potentiometer	Polymer paste on circuit board
Interference rejection	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-3
Climate change	Tested according to DIN IEC 60068-2-14 with -20°C..+80°C

Shock test	Tested according to DIN IEC 60068-2-29 under the following conditions: • Shock form: half sinus • Acceleration: 25 g • Shock time: 6 ms • Direction: x-, y- and z-axis • Quantity of shocks: 4,000 each direction

2 Protocol description (request/response)

As a rule the absolute encoder waits for a request of a bus sharing unit. If the request is identified as correct, it will be directly responded. Prerequisite for identifying the request is that the data bus was idle for at least 1.8 ms. Thus, it is prevented that a protocol of another bus sharing unit will be interpreted as request.

2.1 Baud rate:

After power-up the default setting is 9,600 baud and the absolute encoder is within the initialisation phase, i.e. it waits for a request telegram of a bus sharing unit. Should the telegram be sent with a baud rate of 19,200 baud, the absolute encoder receives unspecified data. After 5 undefined requests that could not be identified, the baud rate will be set to 19,200 baud and afterwards the telegrams will be received correctly and thus responded. In case that it is still impossible to receive a request, the default value will be reset to 9,600 baud.

If the request telegrams are sent with 9,600 baud, the requests will be directly responded.

2.2 Protocol handling quick response

Idle time between request and respond telegram: 60 µsec as a minimum

2.2.1 Request telegram for decreasing values:

Application: Request telegram
Length of telegram: 2 bytes

No	Description	Response	Comment
Byte 0	Start symbol	$A2_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Control byte	$B0_{HEX}$	Fitting position: with clockwise rotation decreasing values

2.2.2 Request telegram for increasing values:

Application: Request telegram
Length of telegram: 2 bytes

No	Description	Response	Comment
Byte 0	Start symbol	$A2_{HEX}$	high nibble: address of absolute encoder low nibble: number of sent bytes
Byte 1	Control byte	$B3_{HEX}$	Fitting position: with clockwise rotation increasing values

2.2.3 Respond telegram:

Application: response end switch, position report
Length of telegram: 3 bytes
Idle time between request and respond telegram: 60 µsec as a minimum

No	Description	Response	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	$??_{HEX}$	Position (unsigned int) 0..8191 resp. 0..$1FFF_{HEX}$
Byte 2	Position Low-Byte	$??_{HEX}$	

2.2.4 Error messages:

Application: response end switch, error
Length of telegram: 3 bytes
Idle time between request and respond telegram: 60 µsec as a minimum

No	Description	Respond	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	FA_{HEX}	Mechanical failure of the grinder
Byte 2	Position Low-Byte	FA_{HEX}	

No	Description	Respond	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	FB_{HEX}	Failure operating voltage
Byte 2	Position Low-Byte	FB_{HEX}	

2.3 Protocol handling slow response

Idle time between request and respond telegram: 150 µsec as a minimum

2.3.1 Request telegram for decreasing values:

Application: Request telegram
Length of telegram: 2 bytes

No	Description	Response	Comment
Byte 0	Start symbol	$A2_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Control byte	$B1_{HEX}$	Fitting position: with clockwise rotation decreasing values

2.3.2 Request telegram for increasing values:

Application: Request telegram
Length of telegram: 2 bytes

No	Description	Response	Comment
Byte 0	Start symbol	$A2_{HEX}$	high nibble: address of absolute encoder low nibble: number of sent bytes
Byte 1	Control byte	$B4_{HEX}$	Fitting position: with clockwise rotation increasing values

2.3.3 Respond telegram:

Application: response end switch, position report
Length of telegram: 3 bytes
Idle time between request and respond telegram: 150 µsec as a minimum

No	Description	Response	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	$??_{HEX}$	Position (unsigned int) 0..8191 resp. $0..1FFF_{HEX}$
Byte 2	Position Low-Byte	$??_{HEX}$	

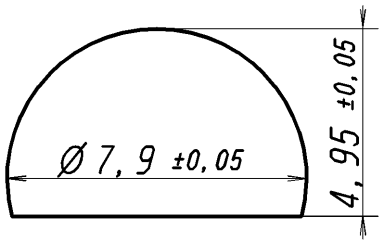
2.3.4 Error messages:

Application: response end switch, error
Length of telegram: 3 bytes
Idle time between request and respond telegram: 150 µsec as a minimum

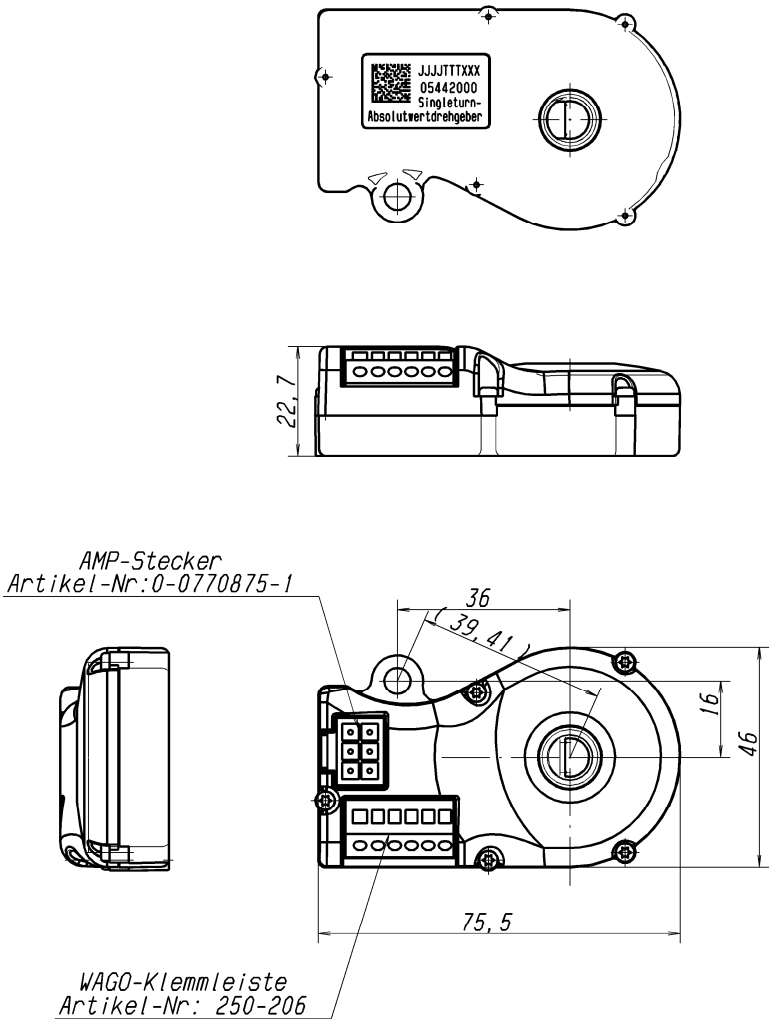
No	Description	Respond	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	FA_{HEX}	Mechanical failure of the grinder
Byte 2	Position Low-Byte	FA_{HEX}	

No	Description	Respond	Comment
Byte 0	Start symbol	$A3_{HEX}$	High nibble: address of absolute encoder Low nibble: number of sent bytes
Byte 1	Position High-Byte	FB_{HEX}	Failure operating voltage
Byte 2	Position Low-Byte	FB_{HEX}	

3 Mechanical interface to shaft and fixing:

Fixing of the encoder	Flat headed screw M4 according to DIN ISO 1580 with washer according to DIN EN ISO 7089
Concentricity tolerance of shaft according DIN ISO 1101	maximum 0.1 mm
Forces in axial direction on the encoder	Not permitted
Dimensions of the shaft:	

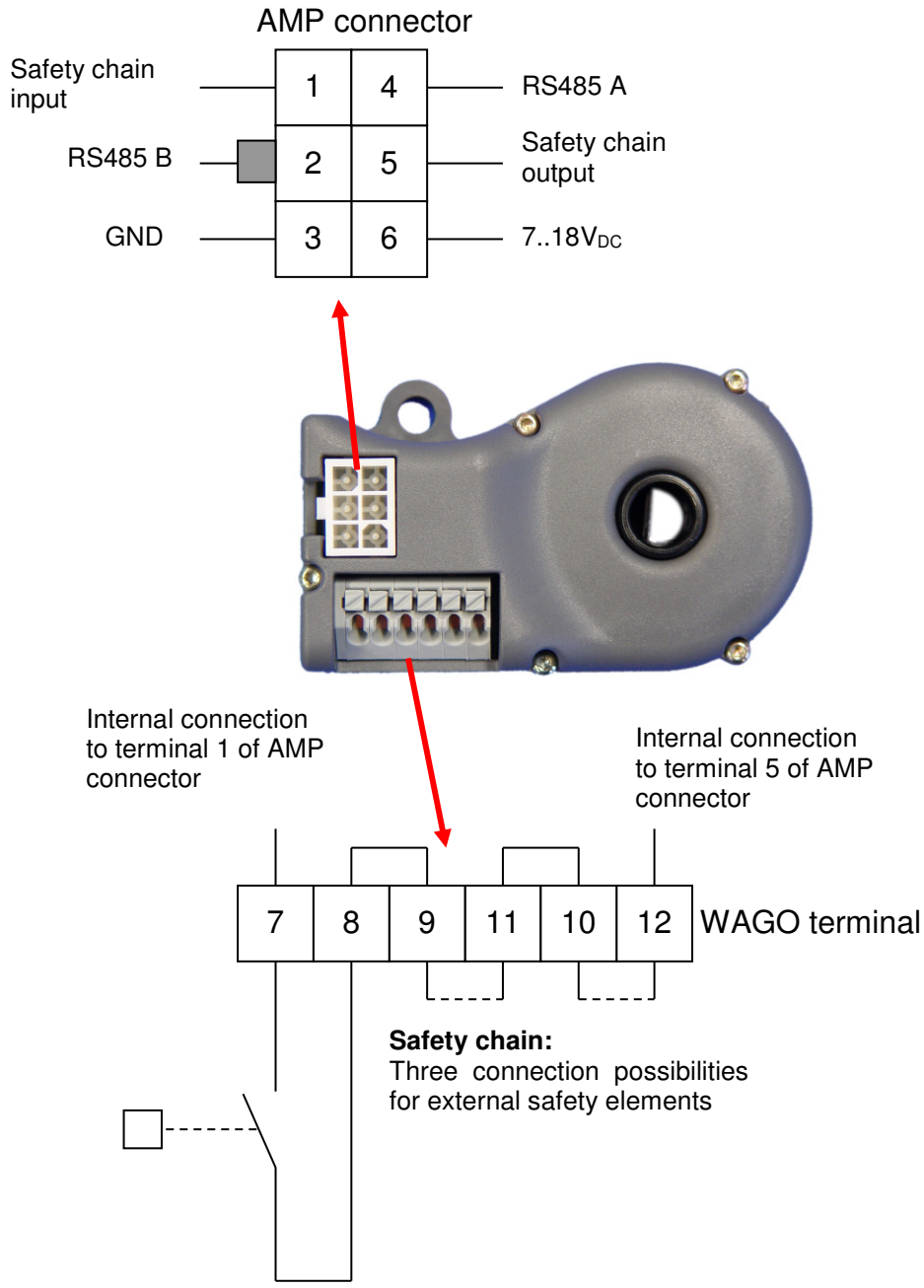
4 Mechanical dimension:



5 Installation notes:

- ⇨ Switch off the voltage before installation
- ⇨ See terminal pin assignment (wrong assignment can lead to destruction).
- ⇨ Connection via separate line.
- ⇨ Moving parts of the sensor system shall not be lubricated with fat or oil

6 Electrical interface:



Konformitätserklärung

Die Firma

KOSTAL Industrie Elektrik GmbH
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erklärt in alleiniger Verantwortung, dass folgendes Produkt:

Singleturn-Absolutwertdrehgeber

Kl-Artikelnummer: 05 4420 00

auf das sich diese Erklärung bezieht, mit folgenden Normen übereinstimmt.

- Störfestigkeit Industrie — DIN EN 61000-6-2
- Störaussendung Wohnbereich — DIN EN 61000-6-3

Diese Erklärung gilt für alle identischen Exemplare des Erzeugnisses. Die Erklärung verliert ihre Gültigkeit, falls an dem Gerät eine Änderung vorgenommen oder dieses unsachgemäß angeschlossen wird.

K O S T A L Industrie Elektrik GmbH – Februar 2016

ppa. _____
Dr. Armin von Preetzmann (Leiter Entwicklung)

i.V. _____
Jochen Schäfer (Leiter Qualitätssicherung)

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten!

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