

Datasheet

Draw-wire system SZG60

www.wachendorff-automation.com/szg60

Wachendorff Automation **... systems and encoders**

- Complete systems
- Industrial rugged encoders to suit your application
- Standard range and customer versions
- Maximum permissible loads
- 48-hour express production
- Made in Germany
- Worldwide distributor network

Rugged draw-wire system SZG60



- Ball bearing drill protection
- Measuring rope (stainless steel)
- Bushing
- Quick and easy mounting

www.wachendorff-automation.com/szg60

Customs tariff number: 90318020
Country of origin: Germany

Illustration similar

Mechanical Data

Measurement range	Extraction force		Speed	Acceleration
[mm]	F_{min} [N]	F_{max} [N]	V_{max} [m/s]	a_{max} [m/s ²]
1250	4.6	5.6	10	300

SZG60 with fixed mechanism - direct from stock:

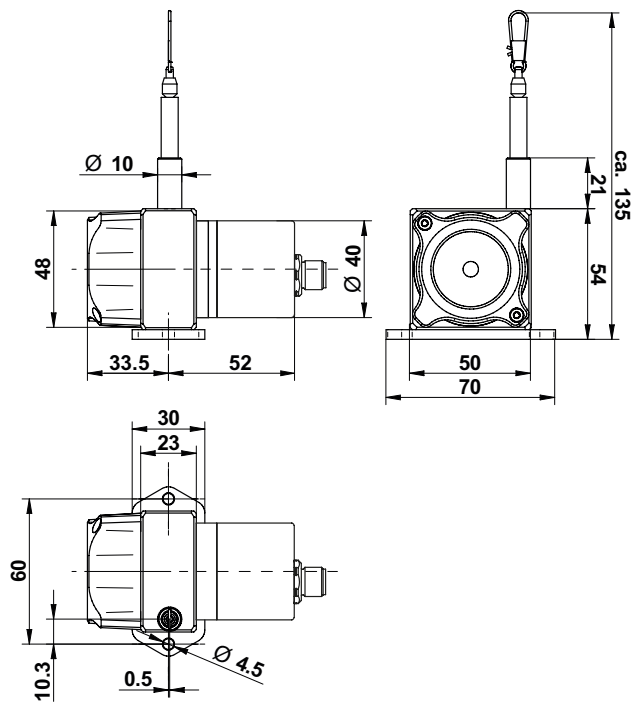
Technical data digital output incremental (with fixed mechanic) Available directly from stock

Measurement range	[mm]	1250
Linearity	[%]	±0.05 (independent of the measurement range)
Disc circumference	[mm]	125
Selectable resolution	[Pulses/mm]	4; 10 (the resolution can be raised by the factor 4 using quadruple edge detection)
Sensor element		Incremental-Encoder with optical code disk
Output signal		A, B pulse (plus inverted pulses /A, /B)
Connection		connector output M12
Humidity		maximum 90 % relative, no condensation
Temperature range	[°C]	-20 °C up to +80 °C
Mechanical data		extraction force, maximum velocity and maximum acceleration see „mechanical data“
Weight	[g]	approx. 400
Housing		aluminium, anodised, spring case PA6
Order No:		4 Pulse/mm: SZG60012500500ABR24SB8 (directly from stock) 10 Pulse/mm: SZG60012501250ABR24SB8 (directly from stock)

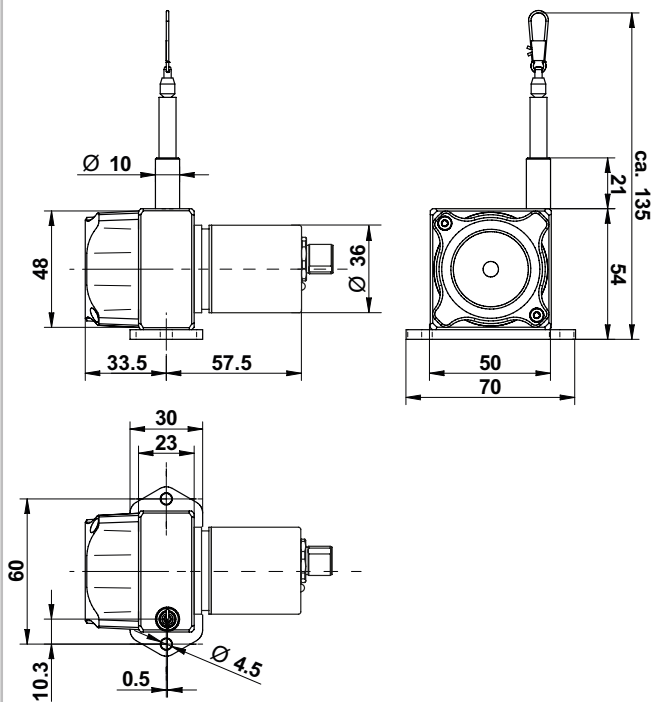
Technical data digital output absolute, CANopen (CAN), SSI (with fixed mechanic) Available directly from stock

		SSI
Measurement range	[mm]	1250
Linearity	[%]	±0.05 (independent of the measurement range)
Disc circumference	[mm]	125
Standard resolution	[Steps/mm]	32.77 (corresponds to 0.03 mm [12 bit])
Sensor element		Multiturn-Absolute-Encoder, magnetic
Connection		connector output M12
Humidity		max. 90 % relative, no condensation
Temperature	[°C]	-20 °C up to +85 °C
Mechanical data		extraction force, maximum velocity and maximum acceleration see „mechanical data“
Weight	[g]	300 to 500, depending on the measurement range
Housing		aluminium, anodised, spring case PA6
Order No:		SZG6001251212SIAG01CB8 (directly from stock)

Technical drawing digital output
incremental (with fixed mechanic)



Technical drawing digital output absolute
SSI (with fixed mechanic)



Technical data incremental encoder (only valid for SZG60 with fixed mechanic)

Resolution

Max. pulses per revolution 500, 1250, 2500 ppr
PPR

Mechanical Data

Housing

Flange round flange
Flange material aluminum
Housing cap aluminum, powder coated
Housing Ø 40 mm
Cam mounting pitch 51 mm

Shaft(s)

Shaft material stainless steel
Starting torque approx. 0.2 Ncm at ambient temperature

Shaft Ø 6 mm
Shaft length L: 12 mm
Max. Permissible shaft loading radial 80 N
Max. Permissible shaft loading axial 50 N

Bearings

Bearings type 2 precision ball bearings
Nominale service life 1 x 10⁹ revs. at 100 % rated shaft load
1 x 10¹⁰ revs. at 40 % rated shaft load
1 x 10¹¹ revs. at 20 % rated shaft load
Max. operating speed 12000 rpm

Machinery Directive: basic data safety integrity level

MTTF_d 200 a
Mission time (TM) 25 a
Nominale service life (L10h) 1 x 10¹¹ revs. at 20 % rated shaft load and 12000 rpm
Diagnostic coverage (DC) 0 %

Electrical Data

Power supply VDC 10 - 30 VDC
Current consumption typ. 70 mA
Signal shape square-wave
Output circuit HTL inverted
Channels AB and inverted signals
Output push-pull
Load max. 40 mA / channel
Signal level mA at 20 mA
Signal level H> H > Vcc - 2.5 VDC
Signal level L< L < 2.5 VDC
Output frequency max. 200 kHz
Circuit protection yes
Light reserve warning no

General Data

Connections connector outlet M12
Protection rating (EN 60529) Housing: IP65, shaft sealed: IP65

Sensor-connector (M12x1) SB, 8-pin

Description

SB8 axial, 8-pin, Connector connected to encoder housing

Assignments

	SB8
	8-pin
	
Circuit	R24
GND	1
(+) Vcc	2
A	3
B	4
Light reserve warning	-
A inv.	6
B inv.	7
n. c.	5, 8
Shield	-

Technical data absolute encoder SSI (only valid for SZG60 with fixed mechanic)

Mechanical Data

Housing

Flange	servo flange
Flange material	aluminum
Housing cap	steel case chrome-plated, magnetic shielding
Housing	Ø 36 mm

Shaft(s)

Shaft material	stainless steel
Starting torque	approx. 0.3 Ncm at ambient temperature

Shaft	Ø 6 mm
Shaft length	L: 11.5 mm
Max. Permissible shaft loading radial	80 N
Max. Permissible shaft loading axial	50 N

Bearings

Bearings type	2 precision ball bearings
Nominal service life	1.4 x 10 ⁸ revs. at 100 % rated shaft load 2 x 10 ⁹ revs. at 40 % rated shaft load 1.7 x 10 ¹⁰ revs. at 20 % rated shaft load
Max. operating speed	12000 rpm

Machinery Directive: basic data safety integrity level

MTTF _d	1000 a
Mission time (TM)	20 a
Nominal service life (L10h)	1.7 x 10 ¹⁰ revs. at 20 % rated shaft load and 12000 rpm
Diagnostic coverage (DC)	0 %

Electrical Data

Power supply/Current consumption	10 VDC up to 32 VDC: typ. 50 mA
Power consumption	max. 0.5 W

Sensor data

Single-turn technology	innovative hall sensor technology
Single-turn resolution	4096 steps/360° (12 bit)
Single-turn accuracy	< ±0.35°
Single-turn repeat accuracy	< ±0.20°

Internal cycle time	≤ 600 µs
Multi-turn technology	patented EnDra® technology no battery, no gear.
Multi-turn resolution	12 bit.

Environmental data

ESD (DIN EN 61000-4-2):	8 kV
Burst (DIN EN 61000-4-4):	2 kV
includes EMC:	DIN EN 61000-6-2 DIN EN 61000-6-3
Vibration: (DIN EN 60068-2-6)	50 m/s ² (10 Hz up to 2000 Hz)
Shock: (DIN EN 60068-2-27)	1000 m/s ² (6 ms)
Design:	according DIN VDE 0160
Turn on time:	<1,5 s

Interface

Interface:	SSI
Clock input:	via opto-coupler
Clock frequency:	100 kHz up to 500 kHz
Data output:	RS485/RS422 compatible
Output code:	gray
SSI output:	Angular-/position value
Turn on time:	<1,5 s

Configuration inputs

Positive direction of counting:	DIR = GND -> cw DIR = +UB -> ccw
(View on shaft)	
Set to zero:	Set: Preset = +UB for 2 s Deactivate: Preset = GND
At Start / while booting:	- red gleam (< 2.3 s)
Malfunction:	- constant red gleam (> 2.3 s)
Normal function:	- constant green gleam
No supply:	- no gleam

General Data

Connections	connector outlet M12
Protection rating (EN 60529)	Housing: IP65, shaft sealed: IP65

Connector, M12x1, CB8, axial, 8-pin

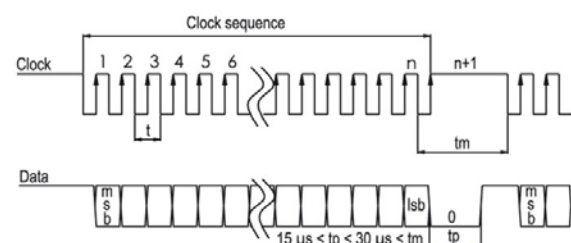
Description

CB8 axial, 8-pin, shield connected to encoder housing

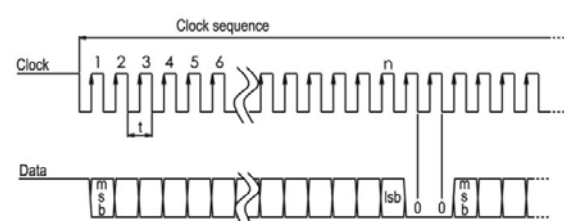
Assignments

	CB8
GND	1
(+) Vcc	2
SSI CLK+	3
SSI CLK-	4
SSI DATA+	5
SSI DATA-	6
PRESET	7
DIR	8
Shield	housing

Transmission protocol SSI Single transmission:



Transmission protocol SSI Multipath transmission:

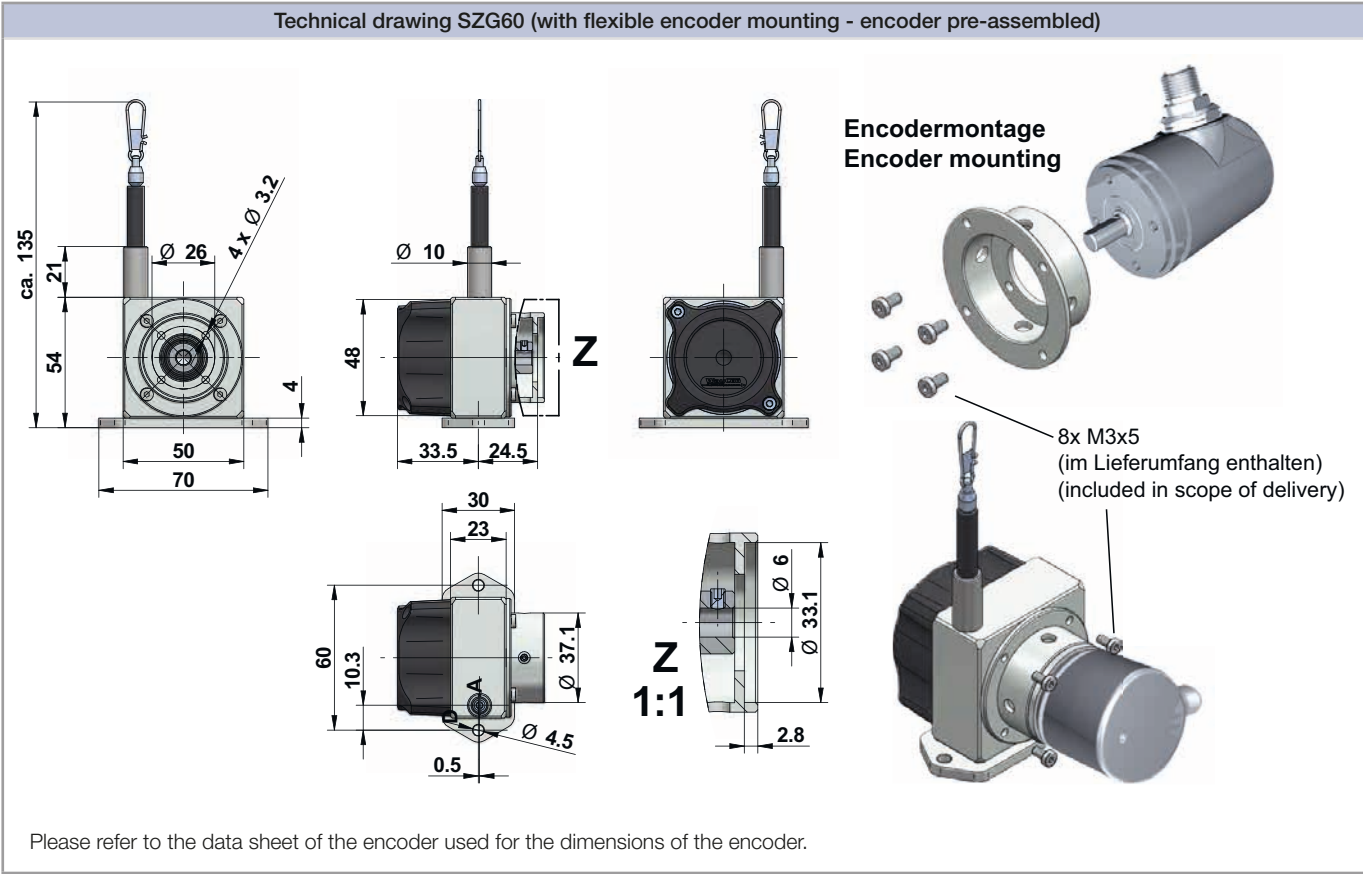


SZG60 with flexible encoder mounting (encoder pre-assembled) - standard delivery time:

Technical data SZG60 (with flexible encoder mounting - standard delivery time)		
Measurement range	[mm]	1250
Linearity	[%]	0.05 (encoder output)
Disc circumference	[mm]	125
Temperature range	[°C]	-20 °C up to +85 °C (observe max. encoder temperature)
Weight	[g]	approx. 500
Housing		aluminium, anodised, spring case PA6
Encoder requirements		WDGI36A/WDGA36A: Shaft: Ø 6 mm, servo flange: Ø 36 mm, shaft length: 11,5 mm
Order No.: without encoder		SZG600125UZVK

Example Order No.: incremental					
Type	Wire length	Pulses	Channels	Output circuit	Connection
SZG60	0125	02500	AB	M35	SB8

Example Order No.: absolute									
Type	Wire length	Single-turn	Multi-turn	Interface	Software	Code	Power supply	galv. isolation	Connection
SZG60	0125	12	18	CO	A	B	0	0	CB5



WARNING NOTICES

- Don't let the rope snap back. If the rope is retracted freely, this may lead to injuries (whiplash effect) and the device may be damaged. Caution when unhooking and retracting the rope into the sensor.
- Never exceed the specified measurement range when extracting the rope!
- Do not touch the rope when operating the sensor.
- Avoid guiding the rope over edges or corners.
Use a deflection pulley instead.
- Do not operate the sensor if the rope is buckled or damaged.
A ripping of the rope may lead to injuries or a damaging of the sensor.
- Do not oil or grease the entire wire pull system.
- Do not pull the measuring wire at an angle.
- Attach the measuring cable retracted to the object to be measured.
- Do not try to open the device. The stored energy of the spring drive may lead to injuries when being mishandled.
- A tensioned measuring cable can lead to injuries in the area where operating personnel are present.
- Do not damage the measuring wire.
- Draw-wire displacement sensors are used for displacement and displacement measurement or position detection of components or moving machine components.
- The sensor may only be operated within the values specified in the technical data.
- The sensor must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the sensor.

	Montage nur qualifiziertes Personal, Personal, Assembly only qualified personnel, Montage par qualifié personnel, Montaggio solo personale qualificato, Montaje solamente personal cualificado. Sicherheitsmassnahmen/Safety instructions: Einsatz nur in Industrieumgebung und NICHT im sicherheitsrelevanten Bereich. Only for use in industrial environments and NOT for safety-relevant areas. Utilisation uniquement dans un environnement industriel et PAS dans un domaine lié à la sécurité. Utilicelo sólo en entornos industriales y NO en áreas relevantes para la seguridad. Utilizzare solo in ambienti industriali e NON in aree riguardanti la sicurezza.
	Power supply: Class 2 only

Installation

- Mount the sensor at the designated place by using the fixing holes before extracting the rope and before attaching the rope to the measuring target.
- Open the rope clip after the sensor is fully mounted and extract the measuring rope. Hook the rope clip on the measuring object and close the bracket of the clip. For safety reasons put a screw driver trough the clip to extract the rope.
- Check the track of the measuring target on collision with the sensor housing and on exceeding the specified measurement range. When installing the sensor make sure that the rubber stopper does not touch the rope outlet.
- Connect the electronics according to the sensor type. When laying the cables be careful not to under-run the minimal allowed bending radius of the cable (5 x cable diameter).
- The rope must be extracted from the sensor vertically. The maximum variation from the vertical is 3°. Avoid carefully extracting the rope at an inclination, since the durability of the instrument would shorten considerably. If it is not possible to keep the limit of 3°, a deflection pulley has to be used.
- The measuring range begins after approximately 2 mm extracted rope (=zero point). The mechanical reserve at the end of the measuring range is about 20 mm.
- When mounting outdoors protect the sensor and the rope from icing at temperatures below 0 °C.
- Guide the rope preferably in corners or guarded in channels to prevent pollution or accidental touch.
- When operating the sensor, take care not to let the rope snap back by mistake or extract the rope over the specified measurement range, as this might destroy the sensor.
- Maintenance: These instruments are maintenance-free. If however, the rope is soiled due to adverse environmental conditions, it can be cleaned with a cloth drenched in resin-free machine oil.

SZG60 Montage Drehgeber

Mounting the mounting flange

1. connect the rotary encoder to the mounting flange. The torque is at least 1 Nm.



Fitting the mounting flange with encoder to the cable pull mechanic

2. align the hole in the flange over the shaft of the encoder so that it is above the grub screw.

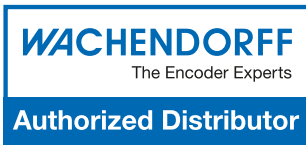


3. tighten the grub screw on the shaft with a torque of 0.6 Nm.



4. align the desired position of the plug/cable outlet and tighten with at least 1 Nm.





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