

## Mounting and operating instruction for SL3000.../ GS 80 + GS 130 in version "constructive security"

document - number:  
5930Z02:BA:01

release: 12.08.2014

### General information

Please read this document carefully before using the Rope Length Transmitter. Pay attention to the safety instructions! Improper handling and carelessness while mounting, damages at the device or accidents can happen. The mounting instructions are part of your product. Please keep them close to the device.

### Intended use

You are only allowed to mount, use and maintain the Rope Length Transmitter if you

- have read and understood the mounting instructions
- are a specialist
- are authorized by your company.

The Rope Length Transmitter should only be used according to the technical data. Unauthorized modifications on the Rope Length Transmitter are not allowed. For resulting damages, we do not take liability. In case of further developments we reserve the right of technical changes.

### Safety instructions

During the normal operation no dangers existing after our level of knowledge. The biggest danger is a braking wire, which can only be happened while fault using or while not keeping the operation parameter.

Possible reasons for a broken or damaged wire

- Exceed of the maximal measuring length  
Damages at the wire through sharp edges and/or objects in the measuring range  
(The measuring range has to be free and secured so that there is no possibility to damage the measuring wire)
- Wire has been squeezed or dejected

Do not pull directly on the wire to avoid kinks/damages! Please only pull on the wire end ring!



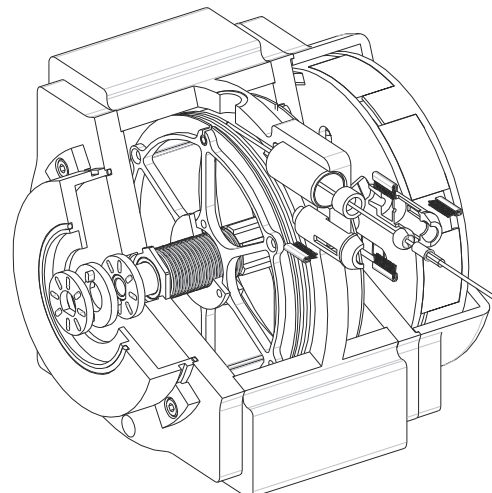
Please do never led draw in the measuring wire unhindered (pull out the measuring wire and led snap back)!

Switch off the voltage of all devices which are concerned of the mounting!

Do not open the device, as the biased power spring can force dangerous injuries!

### Technical description

Rope Length Transmitters of size SL3000 are used for measuring ranges up to 30 m. They contain in a robust aluminium housing a light-weight high precision measuring drum with an extremely robust pull-back mechanism and a highly flexible steel wire on it. The measuring drum, located on a threaded spindle, moves the measuring wire rectilinear to the wire outlet nozzle thereby ensuring high accuracy, reel off speed and operational reliability. Via a coupling or a measuring gear unit a Rotary Angle Transducer can be attached. These encoders convert the number of drum rotations, which is proportional to the measured length into a corresponding measuring signal.

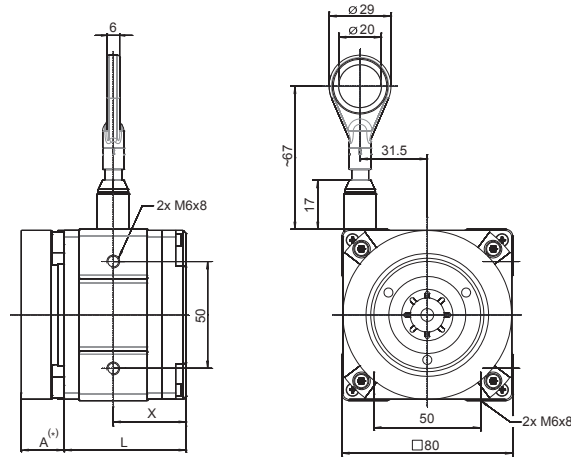


### Mounting the device

The device should stand on a ground level and should be mounted via the winding thrills which are situated on 2 housing sides. The size and the distance of the winding thrills can be found on the drawing. While mounting, please pay attention that the wire outlet is aligned to the wire end ring. As soon as the Rope Length Transmitter is fastened, the wire end ring can be fastened at a moveable object. The application hints has to be taken into consideration. To ensure a potential equalization, the transmitter has to be ground with an earthing terminal.

### Dimensions

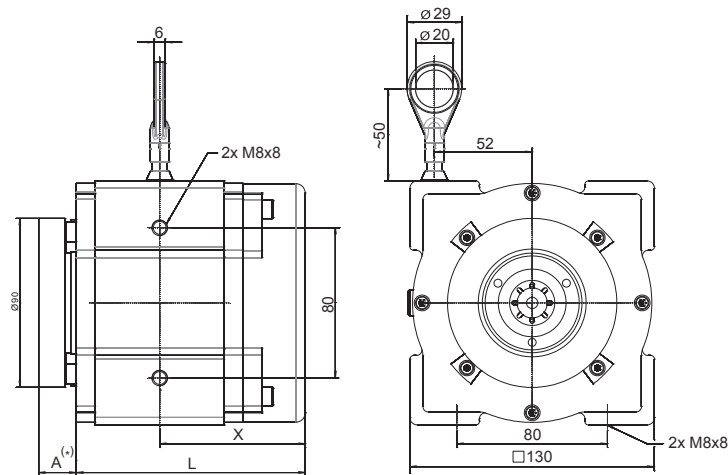
Series GS 80



series	measuring length	distance L	distance X
SL3001	1000 mm	57.0 mm	34.0 mm
SL3002	2000 mm	72.0 mm	41.5 mm
SL3003	3000 mm	97.0 mm	59.0 mm

(\*) Measure A depends on adapted measuring system (e. g. 20 mm for synchro flange, 36.6 mm for clamping flange)

Series GS 130



series	measuring length	distance L**	distance X**
SL3005	5000 mm	121.7 mm	77.4 mm
SL3010	10000 mm	166.7 mm	99.9 mm
SL3015	15000 mm	235.7 mm	146.4 mm
SL3020	20000 mm	280.7 mm	168.9 mm
SL3025	25000 mm	349.7 mm	215.4 mm
SL3030	30000 mm	394.7 mm	237.9 mm

(\*) Measure A depends on adapted measuring system (e. g. 20 mm for synchro flange, 36.6 mm for clamping flange)

(\*\*) With use of a measuring wire with 0.81 mm diameter model is shortened

### Electrical connection of an already mounted encoder (FSG)

Rope length transmitters can be operated with passive encoders (common electrical equipment) in connection with signal converters and intrinsically safe power supplies approved by ATEX. According to the "Leitlinie zur Anwendung der Richtlinien 94/9/EG Absatz 3.7.3" (-> guideline for application of directive 94/9/EG para. 3.7.3) no additional danger occurs for use of a passive encoder mounted in accordance with the regulations. The encoder is to be connected according to connection diagram and connecting information of the signal converters manual. Encoders are preliminary adjusted by the manufacturer. It is possible to adjust them slightly via zero and steepness trimmer of the signal converter.

### Mounting of an external encoder

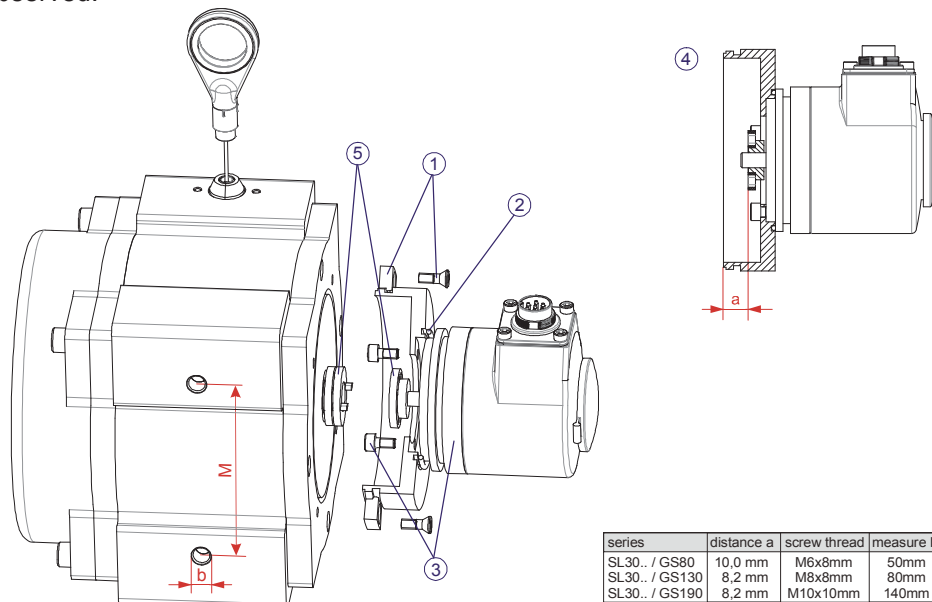
The delivery of the device can also be made without mounted encoder. In this case, the customer can mount an own measuring system at the Rope Length Transmitter. Attention should be paid to:

- Interconnection of non-electrical and electrical equipment, both already rated by a corresponding evaluation procedure of conformity (ATEX approval, type approval) will be admissible in case no additional danger occurs.
- Rope length transmitters can be operated with passive encoders in connection with signal converters and intrinsically safe power supplies, approved by ATEX. According to the guideline mentioned above there is no additional danger by mounting passive encoders used in accordance with the regulations.

If so, the user and person who carries out assembly respectively have to assure that explosion characteristics of the products will not be changed as to the basic safety and health requirements.

According to your order (for example servo or clamp flange), the device has been shipped with a suitable coupling and adapter.

A max. starting torque of 2,0 Ncm should not be exceeded. Installation instructions of the manufacturer have to be observed.



series	distance a	screw thread	measure M
SL30.../GS80	10,0 mm	M6x8mm	50mm
SL30.../GS130	8,2 mm	M8x8mm	80mm
SL30.../GS190	8,2 mm	M10x10mm	140mm

#### Mounting order:

1. Remove the servo flange adapter from casing flange by means of locking clamps.
2. Insert round ring in the adapter.
3. Insert the encoder in the adapter and fix it via attached mounting screws.
4. Place coupling on the encoder shaft. Distance **a** between coupling and the bottom edge of adapter has to be taken from the above table and to be set accordingly.  
**!!! Attention !!! Axial overstraining of driving shaft of the rope length transmitter may limit the function!**
5. Bring coupling to contact and fix adapter via clamps.

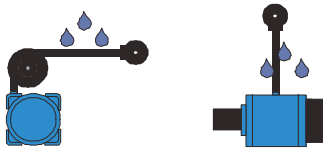
Mounting has to be effected according to above illustration (wire outlet on top). When mounting this way the wire cannot jump off the drum.  
It is only allowed to turn driving shaft by manual draw of measuring wire.



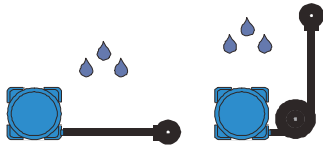
**Non-observance may reduce return pull of spring motor and destroy the wire draw mechanism !**

**Application hints**

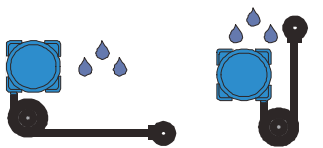
On duty at moist or dusty environments:



The wire inlet must not be mounted in an upright position. Water is running along the wire into the casing. Because of the drilled construction of the wire there is no smooth surface and no 100% sealing is possible.

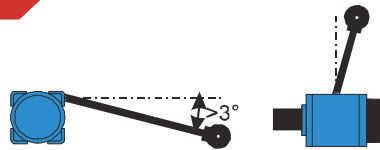


If there is no formation of ice on the wire is expected, a horizontal mounting position of the wire inlet is possible. The inlet should be mounted downside, if possible.

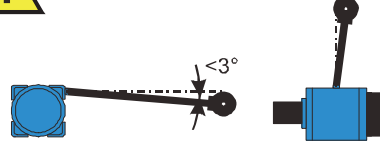


If formation of ice on the wire can be expected, always a pulley should be applied to break the ice. In this case the inlet should always be mounted downwards. This arrangement is preferred anytime, where moisture or dust on the wire will be expected.

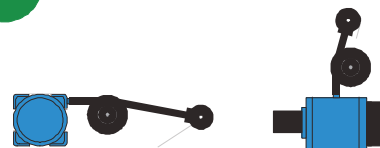
To enhance a better lifetime of the wire:



A straight - line pulling of the wire is recommended !  
An angle of pulling direction larger 3° will cause damage of the wire inlet and malfunctions of pull-back mechanism will occur after a short time on duty.



An angle of pulling direction up to 3° is possible, but not recommended.  
The lifetime may be reduced.



A straight pulling direction is always the best choice.  
This can be realised by using, however, a pulley.

To prevent damage of the measuring wire, following handlings must be avoided:



Never let snap back the wire. Free back-running wire will damage the device.  
Danger of hurt occurs!



Don't pull the wire directly. The wire may be bended and this will cause trouble in the pull-back mechanism.



Don't pull the wire along of edges.  
The wires will be damaged.



www.fernsteuergeraete.de  
E-Mail: info@fernsteuergeraete.de

## Mounting and operating instruction for SL3000.../ GS 80 + GS 130 in version "constructive security"

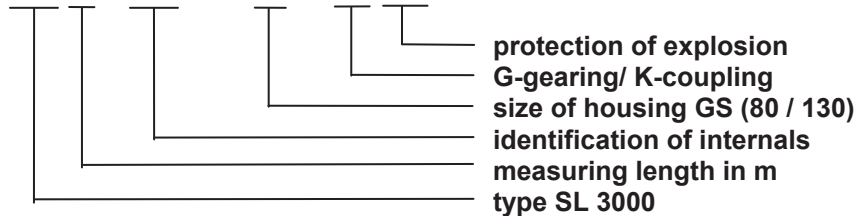
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release: 12.08.2014

### Identification

Type designation code:

**SL30... - ... / GS... - ... EEx**



Identification plate:

Seillängengeber SL 30.../GS...EEx	
Art.-Nr. : Ger.-Nr. : Baujahr:	
Vorlauf: ... mm Seil-Ø: ...mm	Messlänge: ... m max. Abzug: ...m
II 2G c IIC T5	
FSG-Fernsteuergeraete Mess- u. Regellechnik GmbH Mühlenweg 2-3 · D-15712 Königs Wusterhausen	

### Technical data

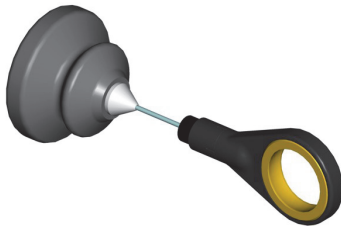
		SL3001..3003 / GS80			SL3005..3030 / GS130					
measuring range to:		1m	2m	3m	5m	10m	15m	20m	25m	30m
housing -	material:	aluminium								
	surface standard:	anodised, colorless								
	surface special:	Hart-Coat plating, nickel plating, lacquered								
spring casing:		ZnAl4, bk lacquered	Alum. bk anodised	plastic, black						
Circumference of drum:		200.0 ± 0.1mm			334.1 ± 0.25mm					
measuring wire-	diameter:	1,35mm								
	material:	stainless steel 1.4401								
	weight:	7.1g/m								
	thermal expansion:	0.017mm*m <sup>-1</sup> *K <sup>-1</sup>								
	min. banding radius:	17mm								
linearity *		± 0.1%								
reproducibility *		0.1% from the measured value								
hysteresis *		0,05%								
force of retractile:		9-13N	7-14N	10-15N	15-20N	8-20N	12-20N	8-20N	10-20N	8-20N
shock resistance:		25g								
speed of adjustment:		8 m/s		10m/s	8 m/s	7 m/s	6 m/s	4 m/s	3 m/s	
acceleration of adjustment:		40m/s <sup>2</sup>		70 m/s <sup>2</sup>	40 m/s <sup>2</sup>	30 m/s <sup>2</sup>	20 m/s <sup>2</sup>	10 m/s <sup>2</sup>	7 m/s <sup>2</sup>	
life time:		200.000 cycles								
protection class (mechanism):		IP 64								
temperature range:		-20°...+70°C								
weight (without encoder):		0.9kg	1.1kg	1.5kg	2.5kg	3.5kg	5.0kg	6.0kg	7.5kg	8.5kg

\*mechanism without gearing

## Accessories

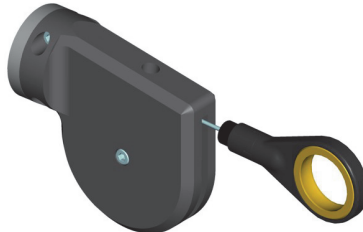
There are a lot of accessories available for the Rope Length Transmitters. In principle, the devices are retrofitable with the accessories. Please see the most important accessories below:

### Wire outlet nozzle with additional bellow



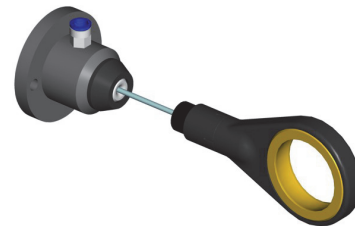
Bellow with steel made dust wiper for enhanced protection requirements against dust, moisture and formation of ice at the wire.

### rope guide pulley



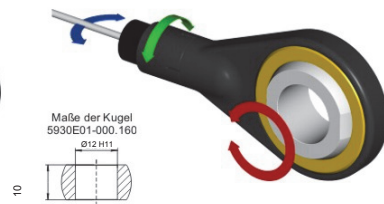
Retrofitable mounted rope guide pulley allows to change the direction of wire movement at 0°..180° in the direction of wire and at 360° square to the direction of wire.

### Wire outlet nozzle with compressed-air nipple



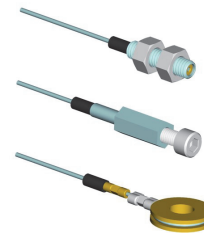
Through overpressure in the wire outlet nozzle the entry of dust and moisture will be prevented by a permanent airstream.

### Ball joint



The retrofit built-in of a ball joint in the wire end ring facilitate a movement in different directions.

### Several wire endings



The measuring systems are also deliverable with different wire endings.

Please ask our sales department, if you need these or other accessories.

## Maintenance and stocking

The Rope Length Transmitter is maintenance-free, while intended using. The pull-back mechanism has to be changed after 200.000 cycles. The numbers of cycles correspond to the used measuring range, maximum acceleration and speed of adjustment. (The mentioned lifetime of the pull-back mechanism can be increased with lower operating parameter.) The maintain work is exclusively to be implemented by the manufacturer. For the observance of the cycles is exclusively the operator responsible.

The Rope Length Transmitter will be delivered well packed and can be stocked on a dry and covered place.

Moist stocking places should not be used. Please be sure that there is no condensation. The relative humidity should favourably be below 65 %.



## Further information



The Rope Length Transmitter should only used to his corresponding purpose!

The Rope Length Transmitter must be installed by trained personnel with knowledge of precision engineering!  
Observe the professional Safety and Accident Prevention Regulations applicable to your country!

Please do not make or interrupt electrical connections to the device when the voltage is switched on!  
A grounding is necessary to grant an undisturbed function at the coupled encoder!

Exceed or fall below of the operating temperature of the device has to be prevented!  
Please avoid shock and vibration load!



# (1) Baumusterprüfbescheinigung

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - Richtlinie 94/9/EG

(3) Baumusterprüfbescheinigung:



## TÜV 03 ATEX 7131 X

(4) Gerät: Seillängengeber der Typen 3000 GS 130 and 3000 GS 80

(5) Hersteller: FSG

(6) Adresse: 15712 Königs Wusterhausen  
Mühlenweg 2 – 3

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die TÜV CERT-Zertifizierungsstelle für Ex-Schutz-Produkte der TÜV Anlagentechnik GmbH, Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg, bescheinigt die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie 94/9/EG und der 20.04.2014 der Richtlinie 2014/34/EU.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr.:195/Ex 131 00 / 03 festgelegt.

(9) Die Grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

**EN 1127 – 1: 2011** **EN 13463 – 1: 2009**  
**EN 13463 – 5: 2011**

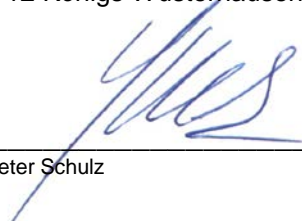
(10) Falls das Zeichen "X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und Prüfung des festgelegten Gerätes gemäss Richtlinien 94/9/EG und der 20.04.2014 der Richtlinie 2014/34/EU. Weitere Anforderungen dieser Richtlinien gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden durch diese Bescheinigung nicht Abgedeckt.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

 **II 2G c T5**

FSG Mess- und Regeltechnik GmbH  
Mühlenweg 2 – 3  
D - 15712 Königs Wusterhausen



Klaus Dieter Schulz

Kablow, 17.01.2017



(1) **Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - Richtlinie 94/9/EG

(3) Baumusterprüfbescheinigungsnummer:



**TÜV 03 ATEX 7131 X**

(4) **Gerät: Seillängengeber Typen 3000 GS 130 und 3000 GS 80**

(5) **Hersteller: FSG**

(6) **Anschrift: 15758 Kablow  
Mühlenweg 2 - 3**

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die TÜV CERT-Zertifizierungsstelle für Ex-Schutz-Produkte der TÜV Anlagentechnik GmbH, Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg, bescheinigt die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie 94/9/EG.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr.: 195 /Ex 131 00 / 03 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

**EN 1127-1: 1997**


**EN 13463-1: 2001**

**prEN 13463-5: 2003**

(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

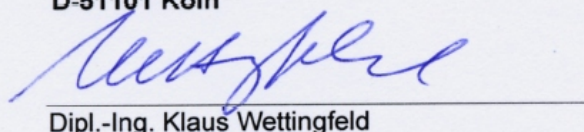
(11) Diese Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden durch diese Bescheinigung nicht abgedeckt.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

 **II 2 G**

**c T5**

TÜV Anlagentechnik GmbH  
Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg  
TÜV CERT-Zertifizierungsstelle für Explosionsschutz  
Am Grauen Stein 1  
D-51101 Köln



Dipl.-Ing. Klaus Wettingfeld

Köln, 19.03.04



# 1<sup>st</sup> Supplement

acc. to directive 94/9/EC, Appendix III, No 6  
to the Type Examination Certificate  
TÜV 03 ATEX 7131 X



Device: Rope Length Transmitter  
Manufacturer: FSG-Fernsteuergeräte Mess- und Regeltechnik GmbH  
Address: Mühlenweg 2-3 D-15758 Kablov

Description of supplements and modifications:

The applied standards have been updated to:  
EN 13463-1: 2009      EN 13463-5: 2003  
EN 1127-1: 2007      EN 60079-11: 2007

The following type has been added:  
Rope Length Transmitter SL 3002-i17.9-PK613/GS 55/01

Technical data:

Refer to the manual for specific technical data.  
Ambient temperature: -20 °C up to +40 °C

The potentiometer need to be connected to an intrinsically safe circuit with its following values:

U<sub>i</sub> ≤ 30 V DC      L<sub>i</sub> = 1 μH  
P<sub>i</sub> ≤ 1.3 W      C<sub>i</sub> = 100 pF

Test Report No.      194/Ex 131.01/09

Special conditions for safe use

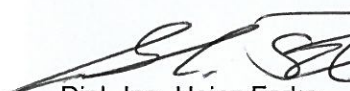
The conditions remain unchanged with respect to the original certificate.  
The manual has to be noted before use.

The type of protection and the marking is as follows:

⊕ II 2 G      c IIC T5

TÜV CERT - Zertifizierungsstelle

Cologne, 14<sup>th</sup> October 2009

  
Dipl.-Ing. Heinz Farke



This 1<sup>st</sup> supplement to the type examination certificate is not valid without signature and official stamp.  
This certificate may be circulated only without alteration. Extracts or alterations are subject to approval by  
TÜV-Cert-Zertifizierungsstelle of TÜV Rheinland Industrie Service GmbH  
In case of dispute, the German text shall prevail

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(13) **Anlage**

(14) **Baumusterprüfbescheinigung TÜV 03 ATEX 7131 X**

(15) 15.1 Gegenstand und Typ

Seillängengeber **SL 3000 . . . / GS 80 + 130**

15.2 Beschreibung des Gerätes

Seillängengeber (dieser Baureihe) dienen zur Erfassung von Messstrecken bis zu 30 Metern. Sie enthalten in einem stabilen Aluminiumgehäuse eine massearme, genaue Messtrommel mit stabilem Federrückzug, auf die ein hochflexibles Stahlseil einlagig gespult wird. Die auf einer Gewindest spindle gelagerte Messtrommel verfährt beim Seilabzug das Messseil geradlinig zur Seilaustrittsdüse. Über eine Kupplung oder ein Messgetriebe können Drehwinkelmeßumformer angeflanscht werden, welche die längenproportionale Anzahl der Trommelumdrehungen in ein entsprechendes Messsignal umwandeln.

15.2.1 Kenngrößen

15.2.1.1 Technische und thermische Daten

**. . . / GS 80**

Gerätetyp	SL 3001	SL 3002	SL 3003	
Meßlänge	1.000	2.000	3.000	mm
Zugkraft	5...10			N
Gewicht	0.9	1.2	1.5	kg
Gehäuse	Werkstoff		3.3206.71 AIMgSi0.5F22	
	Oberfläche Standard		eloxiert	
	Oberfläche Sonderausführung		Hard-Coat und /oder lackiert	
	Betriebstemperatur		- 20 .. 70 °C	
Meßseil	Werkstoff		1.4401 X5 CrNiMo 18 10	
	Durchmesser		1.35 mm	
	Gewicht		7.1 g/m	
	Wärmedehnung		0.017 mm/mK	
	Mindestbiegeradius		15 mm	

... / GS 130

Gerätetyp	SL 3005	SL 3010	SL 3015	SL 3020	SL 3025	SL 3030	
Meßlänge	5.000	10.000	15.000	20.000	25.000	30.000	mm
Zugkraft	10..21						N
Gewicht	2.5	3.5	5.0	6.0	7.5	9.0	kg
Gehäuse	Werkstoff			3.3206.71		AlMgSi0.5F22	
	Oberfläche Standard			eloxiert			
	Oberfläche Sonderausführung			Hard-Coat und /oder lackiert			
	Betriebstemperatur			- 20 .. 70 °C			
Meßseil	Werkstoff			1.4401		X5 CrNiMo 18 10	
	Durchmesser			0.81		1.35	
	Gewicht			2.6		7.1	
	Wärmedehnung			0.013		0.017	
	Mindestbiegeradius			10		15	

(16) Prüfbericht-Nr. 195/Ex131.00/03

(17) Besondere Bedingungen Es sind zusätzlich folgende Errichtungs- und Betriebsvorschriften zu beachten:

1. Die Seillängengeber SL 3000 ... / GS 80 + 130 sind so an die Konstruktion zu montieren, dass in keinem Fall die Schutzkappe, die die Spiralfeder umschließt im Verfahrensweg des zu messenden Weges liegt und zerstört werden kann. Andernfalls ist bauseits eine Schutzkonstruktion vorzusehen.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen Anforderungen