

Description

B-IS13.21-en

**Pulse Generator**  
**G16**

**KNORR-BREMSE**  
Systems for Rail Vehicles



**Copyright ©****KNORR-BREMSE****Systeme für Schienenfahrzeuge GmbH**

Moosacher Strasse 80, D-80809 München

Dept.: Technische Dokumentation

Phone: +49 (89) 3547-0

Fax: +49 (89) 3547-2767

This document is protected by copyright. All rights are reserved.

Reproduction in whole or in part is not permitted without the express, written approval of KNORR-BREMSE Systeme für Schienenfahrzeuge GmbH, München.

**Technical changes**

KNORR-BREMSE Sfs reserves the right to change the product or this document at any time without giving special notice.

This document will be rendered invalid if it is affected in any way by changes to the product.

**Related documents:**

Installation directive	2B77942
Installation document	PK-IB20-114-en

**KNORR-BREMSE Sfs  
customer documentation**

KNORR-BREMSE Sfs customer documentation is written for vehicle builders who plan the use of, and install, KNORR-BREMSE Sfs equipment, and for vehicle operators who use, service, repair and overhaul this equipment.

In order to use your KNORR-BREMSE Sfs products safely and reliably, you require the complete set of KNORR-BREMSE Sfs customer documentation that is written specially for your product. This set is based on the following structure:

**Basic document:** Safety manual

**System documentation:** System description  
System parts list  
Circuit diagrams

**Equipment documentation:** Installation drawings  
Descriptions  
Overhaul instructions  
Test instructions  
Spare parts lists

**Symbols and conventions:****NOTE**

Notes, tips and recommendations

Cautions and warnings that are **absolutely mandatory**.

**CAUTION**

Risk of damage to equipment.

**WARNING**

Risk of bodily harm and damage to equipment.

## Contents

	Page		Page
<b>1</b>	<b>5</b>	<b>6</b>	<b>11</b>
<b>Introduction</b>		<b>Operation and handling</b>	
<b>2</b>	<b>5</b>	6.1	<b>11</b>
<b>Safety</b>		6.2	<b>11</b>
2.1	<b>5</b>	<b>7</b>	<b>11</b>
Validity		<b>Maintenance</b>	
2.2	<b>5</b>		
Authorized use of the product			
2.3	<b>5</b>		
Safety regulations			
2.4	<b>5</b>		
Manufacturer's responsibility			
<b>3</b>	<b>6</b>	<b>Tables</b>	
<b>Construction</b>		1	<b>7</b>
3.1	<b>6</b>	2	<b>11</b>
Design features		<b>Troubleshooting</b>	
3.2	<b>6</b>		
Structural features			
3.3	<b>6</b>		
Fundamentals of planning			
<b>4</b>	<b>7</b>		
<b>Working principle</b>			
<b>5</b>	<b>10</b>		
<b>Installation</b>			
5.1	<b>10</b>		
Requirements			
5.2	<b>10</b>		
Procedure			
5.3	<b>10</b>		
Setup			

## 1 Introduction

The model G16 pulse generator is a sensor which is capable of measuring the speed of a ferromagnetic gear wheel (rotating gear) without making contact. It is used preferably for recording the axle speed.

Being of rugged construction, this pulse generator is especially suitable for use in rail vehicles.



### NOTE

Please read this Description carefully from start to finish before commencing any work on the G16 pulse generator. In this way you will avoid wasting time and money.

## 2 Safety

### 2.1 Validity

This Description is valid for G16 pulse generators with

- Item No. II34819/...
- Item No. II35435/...
- Item No. II35436/...
- Item No. II35437/...
- Item No. II35452/...
- Item No. II35455/...
- Item No. II35456/...
- Item No. II38240/...
- Item No. II39567/...



### NOTE

Please refer to the name plate for particulars of the item number.

## 2.2 Authorized use of the product

The G16 pulse generator is designed to measure the speed of a ferromagnetic gear wheel without making contact. It must always be used in the manner stipulated by KNORR-BREMSE SfS, and in compliance with all installation and repair instructions.

## 2.3 Safety regulations

Special warnings in other parts of this Description draw your attention to the individual risks concerning your use of the product. Warnings and directions for use generally precede our descriptions of the relevant applications.

## 2.4 Manufacturer's responsibility

KNORR-BREMSE Systeme für Schienenfahrzeuge GmbH cannot be held liable for anything affecting the safety, reliability or performance of the G16 pulse generator if:

- this product is commissioned, operated, serviced and overhauled by personnel not qualified to take such action.
- the pulse generator is not used for the authorized purpose.
- other than genuine KNORR spares are used or KNORR spares are changed technically in any way.

### 3 Construction

#### 3.1 Design features

The G16 pulse generator comes in several different versions. All of them have a pickup and electronic interpreter installed in a casing which is joined to a flange by two screws.

The connecting cables differ in length and/or type. Fig. 1 contains an overview of the various models, while Table 1 pairs them with their item numbers.

Versions having an elbow fitted at the end of the protective hose are available for special mounting conditions.

#### 3.2 Structural features

The G16 pulse generator consists essentially of a magnetoresistive pickup to which is connected an electronic interpreter. Both items are hermetically sealed inside an aluminium die casting.

A rugged hose and a metal cap on the pulse generator scanning face give sufficient physical protection to the pickup and the encapsulated cabling.

The electronic part of the G16 pulse generator is short-circuit-proof and designed to prevent reversal of polarity.

The pulse generator has been developed in compliance with IEC Standard 801-3. Provided it is correctly installed and connected, the pulse generator is EMC-proof, i.e. its electronic circuitry is shielded from electromagnetic interference up to a field strength of 200 V/m.

#### 3.3 Fundamentals of planning

The electrical characteristics are shown in the KNORR-BREMSE installation drawing valid for the pulse generator.

The pulse generator can be operated in the ambient temperature range between  $-40^{\circ}\text{C}$  and  $+100^{\circ}\text{C}$ .

It is designed for use within the overall electrical system installed in a vehicle. KNORR-BREMSE installation document **PK-IB20-114-en** shows what conditions must be satisfied before KNORR-BREMSE components can be installed and operated in accordance with EMC specifications. The instructions in this installation document are mandatory.

Mounting dimensions for the pulse generator, and rules for designing the rotating gear and its mounting are given both in installation directive **2B77942**, and in the pulse generator drawing that goes with the associated vehicle.

Available as an optional extra is a casing in which the pulse generator can be housed for protection when the bogie is removed (e.g. for maintenance); the pulse generator does not need to be disconnected in this case. The casing is to be welded to the car body (see **2B77942**).

**Table 1** Versions and item numbers

Item number	Cable end fastening	Contact
II34819/...	Threaded hose union	Tab connectors
II35435/...	Threaded hose union	No contacts
II35436/...	Threaded hose union	Wire end sleeves
II35437/...	Threaded hose union	Cable terminal
II35452/...	Fastened to connector case	Connector case
II35455/...	No means of fastening	No contacts
II35456/...0	Threaded hose union	Tab connectors
II35456/...1	Threaded hose union	No contacts
II35456/...2	Threaded hose union	Wire end sleeves
II35456/...3	Threaded hose union	Cable terminal
II35456/...4	Threaded hose union	Cable terminal
II38240/...	Threaded hose union	No contacts
II39567/...	No means of fastening	No contacts

#### 4 Working principle

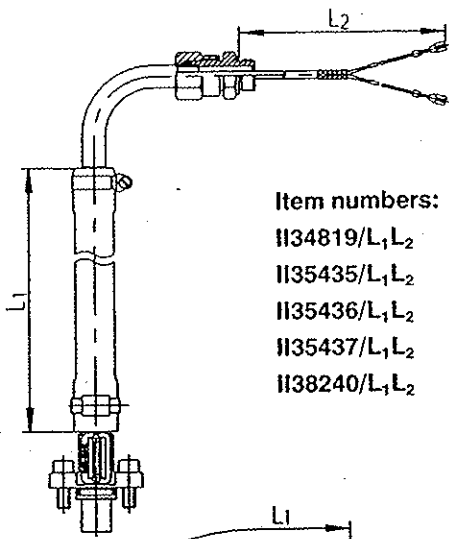
The pulse generator senses the teeth and gaps on a rotating, ferromagnetic gear wheel of given geometry. The magnetic field changes are converted into electric signals by a pickup.

A current of 7mA or 14mA is applied to the output via an electronic interpreter. The axle speed is ascertained from the number of pulses per unit time.

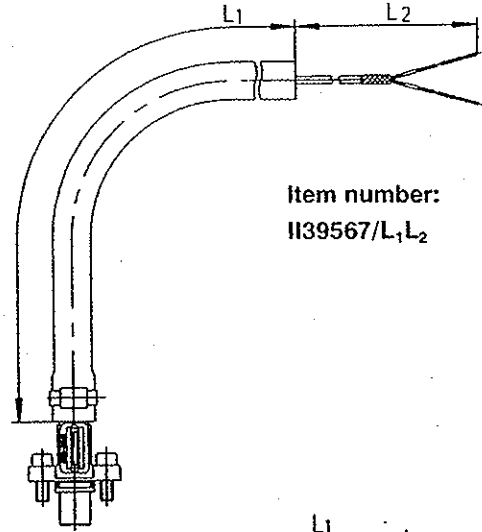
Depending on the type of unit (see installation drawing), the output current from the G16 pulse generator at standstill is either  $I_{SHIGH}$  (14mA) or  $I_{SLOW}$  (7mA).

Fig. 1

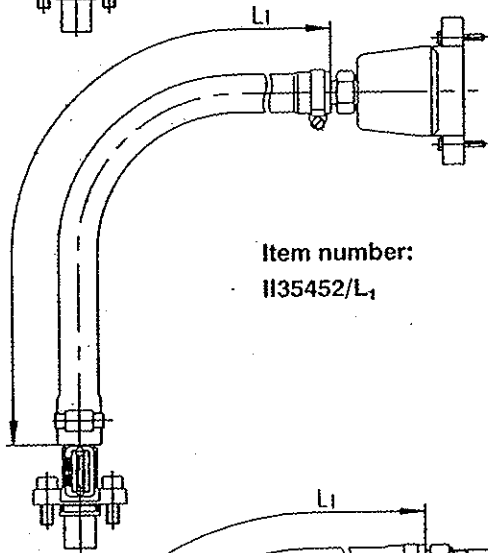
Means of fastening the cable end,  
and ascertaining the cable length from the item number



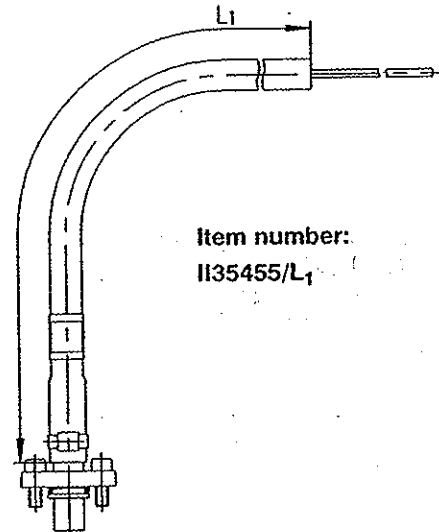
Item numbers:  
 II34819/L<sub>1</sub>L<sub>2</sub>  
 II35435/L<sub>1</sub>L<sub>2</sub>  
 II35436/L<sub>1</sub>L<sub>2</sub>  
 II35437/L<sub>1</sub>L<sub>2</sub>  
 II38240/L<sub>1</sub>L<sub>2</sub>



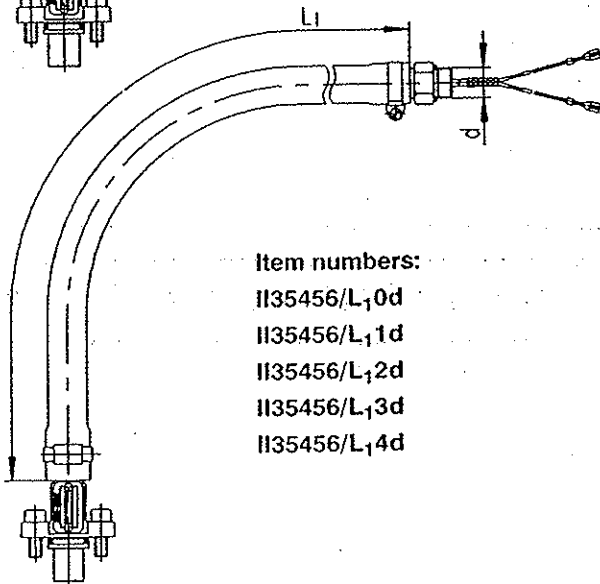
Item number:  
 II39567/L<sub>1</sub>L<sub>2</sub>



Item number:  
 II35452/L<sub>1</sub>



Item number:  
 II35455/L<sub>1</sub>



Item numbers:  
 II35456/L<sub>1</sub>0d  
 II35456/L<sub>1</sub>1d  
 II35456/L<sub>1</sub>2d  
 II35456/L<sub>1</sub>3d  
 II35456/L<sub>1</sub>4d

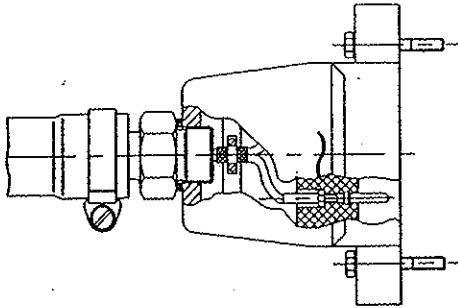
L<sub>1</sub> Length in cm  
 L<sub>2</sub> Length in cm or dm  
 (II38240/...)  
 d Threads:  
 1 = PG11 DIN40430  
 2 = PG13.5 DIN40430

C 18041/1

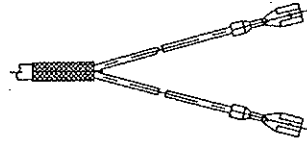
Fig. 2

Possible cable ends

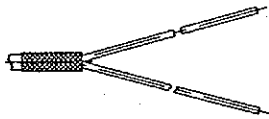
Item number:  
1135452/...



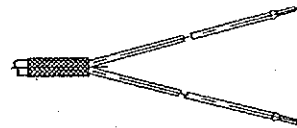
Item numbers:  
1134819/...  
1135456/...0.



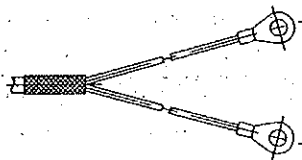
Item numbers:  
1135435/.....  
1135456/...1.  
1138240/.....  
1139567/.....



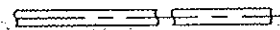
Item numbers:  
1135436/.....  
1135456/...2.



Item numbers:  
1135437/.....  
1135456/...3.  
1135456/...4.



Item number:  
1135455/...



C 18041/2



## 5 Installation

### 5.1 Requirements

The work of installing the GI6 pulse generator must always be left to suitably qualified personnel who are familiar with the statutory regulations and are authorized by the bogie manufacturer, vehicle builder or vehicle operator.

Before installing the pulse generator, check its item number (see name plate) against that required for the vehicle (see work schedule). This is to ensure that the correct pulse generator is fitted.

### 5.2 Procedure

**WARNING**  
Fix the vehicle in place before installing the pulse generator or working on it in situ.

**WARNING**  
Never attempt to remove or install the pulse generator before disconnecting the power supply. Also observe the applicable safety regulations for working on electrical equipment.

**NOTE**  
Take care not to bend the protective hose too far upon installation. The smallest permissible bending radius is 90mm.

Each time the GI6 pulse generator is installed, use a new sealing ring (2, see Fig. 3) and new self-locking screws (4).

Torque both machine screws (4) to 25 Nm.

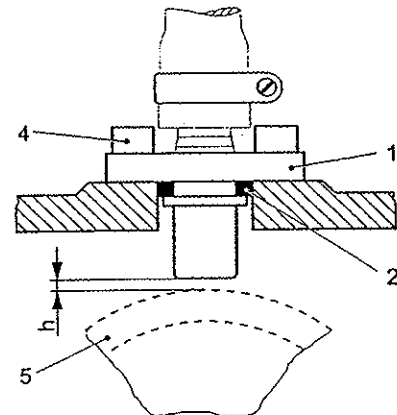
Having installed the pulse generator, verify the reference size 'h, Fig. 3) indicated in installation directive 2B77942. If necessary, correct the distance between the pulse generator and the teeth of the rotating gear.

The cable conductors must be hooked up as directed in the KNORR-BREMSE installation drawing valid for the pulse generator (check the color coding).

### 5.3 Setup

The GI6 pulse generator is ready for operation upon installation and proper connection of the lines.

Fig. 3 Installing the pulse generator



- |   |                 |   |   |
|---|-----------------|---|---|
| 1 | Pulse generator | h | Distance between pulse generator and rotating gear (see installation directive 2B77942) |
| 2 | Sealing ring    |   |   |
| 4 | Machine screw   |   |   |
| 5 | Rotating gear   |   |   |

C18041/3

## 6 Operation and handling

### 6.1 Function monitoring

*Pulse generators having a current output:*  
The KNORR electronic brake controller signals electrical defects at standstill

### 6.2 Disposal

Various parts of the GI6 pulse generator, e.g. copper and plastic constituents, can be recycled. Proper disposal should account for such materials.



#### NOTE

An erroneous display may be due to a bad connecting cable.

Table 2 Troubleshooting

Problem	Cause	Remedy
Speed signal missing or erroneous	Pulse generator's electric cable is damaged	Replace the pulse generator.
	Electric cabling in the vehicle is damaged	Replace the electric cabling.
	Distance h (see Fig. 3) between pulse generator and rotating gear is out of specification	Check the distance and correct if necessary (see Section 5.2).
	End face of pulse generator is damaged	Replace the pulse generator.
	Electronic part of pulse generator is defective	Check electronic circuitry against the applicable KNORR-BREMSE Test Instructions. If necessary, replace the pulse generator.

## 7 Maintenance

The GI6 pulse generator works without wear or contact, and therefore requires no special maintenance. It merely needs checking for good external condition and proper operation at regular intervals in accordance with the applicable railway administration regulations.