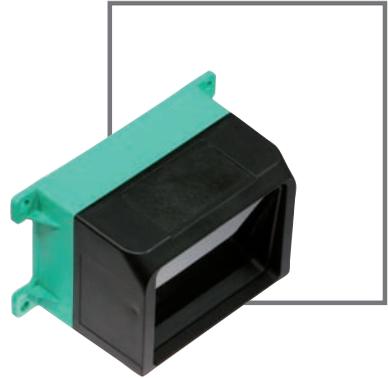


MANUAL

**DISTANCE SENSOR
VDM54**



CE



With regard to the supply of products, the current issue of the following document is applicable:
The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

Date of issue 09/30/2009 Part No. 210598

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1 Introduction

Congratulations

You have chosen a device from Pepperl+Fuchs. Pepperl+Fuchs develops, manufactures, and markets electronic sensors and interface components for the factory automation market on a global scale.

Contact

If you have any questions about the device, accessories, or function, please contact:

Pepperl+Fuchs GmbH
Lilienthalstraße 200
D-68307 Mannheim
Telephone: 0621 776-1111
Fax: 0621 776-271111
e-mail: fa-info@de.pepperl-fuchs.com

1.1 Warranty

Pepperl+Fuchs manufactures its products according to recognized industrial standards. Pepperl+Fuchs guarantees its products to be free of defects in material and workmanship provided the products are used under the normal operating conditions specified by the manufacturer. The warranty applies only to the original owner and is not transferable. All accompanying exclusions of liability, restrictions, and other conditions of this section apply to this warranty.

Exclusion of liability

The warranty shall not apply to products that:

- have been repaired, modified, or tampered with unless explicitly performed or approved by Pepperl+Fuchs,
- have not been maintained in accordance with the operating and handling instructions provided by Pepperl+Fuchs,
- have been exposed to unusual physical or electrical loads, immersed in liquids, or have been exposed to any one of the following:
 - breakdown
 - crushing
 - improper use
 - abuse
 - low current
 - unsuitable power supply
 - reverse polarity
 - negligence or accident
- have been used for any purpose other than what is described in the operating and handling instructions.

Preventive maintenance is the responsibility of the customer and is not covered by this warranty.

General

With the exception of the warranties noted above, Pepperl+Fuchs offers no warranties for products supplied in any form whatsoever, whether explicit or implicit, including, but not limited to implicit warranties for defects and guarantees of suitability for a special purpose and non-infringement of third-party rights. The explicit warranties noted above shall satisfy all obligations and liabilities of Pepperl+Fuchs for damages, including, but not limited to concrete damages, indirect damages, or consequential damages in connection with the use or design of the product. The seller's liability to the buyer and other persons (regardless of the origin of liability, whether it be based on contract, warranty, impermissible handling, misuse, and/or other origin) in connection with the use of a product shall under no circumstances exceed the original purchase price of the product. Pepperl+Fuchs shall in no event be liable for consequential damages, concrete and indirect damages, secondary damages or penalties, lost profits or sales, or loss of data, even if Pepperl+Fuchs had been informed of this possibility in writing.

2 Declaration of Conformity

Pepperl+Fuchs GmbH hereby declares under sole responsibility that the

Distance sensor VDM54

and all models of this product to which this declaration refers, complies with the following standards and other regulatory documents

EN 60947-5-2

Product standard: Electromagnetic Compatibility (EMC for control technology, industry)

	A corresponding declaration of conformity can be requested from the manufacturer.
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Pepperl+Fuchs GmbH in D-68301 Mannheim has a certified quality assurance program in accordance with ISO 9001.



3 Safety

3.1 Symbols used

Safety related symbols

	Danger! This symbol identifies an immediate and present danger. Failure to heed this warning may result in serious or even fatal injury.
	Warning! This symbol warns the user of a possible malfunction or danger. Failure to heed this warning may result in personal injury or extensive property damage.
	Caution! This symbol warns the user of a possible malfunction. If the instruction given in this warning is not heeded, the device and any plant or systems connected to it may develop a fault or fail completely.

Information symbols



Note!

This symbol draws your attention to important information.



Instruction

This symbol indicates a required action.

3.2 General safety instructions

The following basic instructions must be observed at all times:

- The device must not be placed into service until the manual has been read and understood
- The power supply for generating the supply voltage must be insulated by a double insulation and a safety transformer according to DIN VDE 0551 (complies with IEC 742).
- The device must not be used outside the specifications without taking suitable protective measures
- No unauthorized tampering with the device is permitted
- Do not point the device directly towards the sun or take measurements in direct sunlight
- Do not remove the warning/machine labels

The radiation emitted from a class 1 laser is harmless. This type of laser instrument can be operated by anyone.

The company operating the device is responsible for planning, assembly, commissioning, operation, and maintenance.

Installation and commissioning of all devices must only be performed by personnel specially trained for that purpose.

The protection of the operating personnel and the overall system is not ensured if the assembly is not used according to its intended purpose.

Observe the laws and/or directives applicable to the use or planned application. The devices are only approved for proper use in accordance with their intended purpose. Failure to comply with these provisions will invalidate all warranties and absolve the manufacturer of all liability.

Use only recommended original accessories.

If malfunctions cannot be eliminated, take the device out of service and secure it from accidental use. Secure the device against inadvertent operation. For repairs to the device, send the device to Pepperl+Fuchs. Only Pepperl+Fuchs can make repairs to the device. Interventions in and modifications to the device are not permissible, render the warranty null and void, and exclude the manufacturer from any liability.

Dispose of the device according to all applicable laws and regulations.

For example, you can take the sensor to the designated collection center for electronic scrap.



In applications with shelf stacking equipment and moving carriages, care must always be taken to observe the applicable safety regulations. Failure to observe this warning can result in fatal injury!

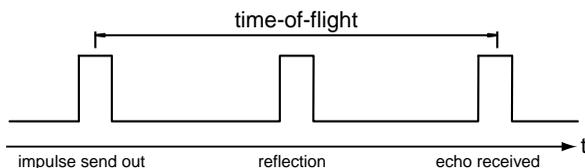
4 Product description

VDM54

The VDM54 is the reliable solution for measuring the distance between vehicles on rail mounted tracks. Braking distances and distances between vehicles differ according to the type of goods being carried, the length of the vehicle, and the speed of the vehicle. This requires adjustable switching distances. Constantly changing objects around vehicles and the presence of other sensors do not impair the VDM54's ability to accurately measure distances. In order to maintain the reliability of the distance measuring function and ensure accurate switching points, regardless of the surroundings and conditions of the vehicles themselves, a reflector is fitted to the rear of every vehicle in the installation. The VDM54 is fitted to the front of each vehicle and always points at the reflector on the vehicle directly ahead. When the vehicle reaches the currently selected braking distance, the switching output is activated and the vehicle slows down. When the vehicle reaches the selected stopping distance, it comes to a complete standstill. Once the vehicle in front begins to move, the signals are enabled and the vehicle travels forward. When using vehicles of variable length, e.g. due to overhanging loads, the distances maintained in the installation can be varied. This VDM54 function enables optimum use of congested areas.

Measurement principle

The VDM54 works on the principle of optical time of flight measurement. Distance measurement uses the physical principle that light always spreads at a constant speed of $c=299,792$ kilometers per second. In other words, light travels a distance of 1 m in 3.335 ns (0.000,000,003,35 s). With pulsed time of flight measurement, a very short light impulse is emitted, reflected, and registered by the receiver; the measured time is stopped at that very same moment. The emitted impulse triggers a clock which is stopped by the received impulse. The time elapsed (time of flight) is always proportional to the optical path length.



Use of this physical principle makes VDM54 ideal for optical anti-collision distance measurement.

4.1 Models

4.1.1 VDM54-6000-R/20/105

- Detection range: 0 – 6 m
- Aperture angle: horizontal ± 7.5 degrees; vertical ± 3.5 degrees
- 2 PNP NC outputs Q1, Q2
- 1 range selection input

The four signal points (close / far for both Q1 and Q2) are programmed via a ConfigBox. The ConfigBox has a serial RS-232 interface and connects to the VDM54 with a programming cable.

Distance values for switch points can be programmed using parameter software currently available free of charge.

Advantages: It is very simple to install in existing installations. Sensor settings are easy to reproduce and can be recorded. Sensors can be easily preset outside the installation (short commissioning time).

4.1.2 VDM54-6000-R/20/88/105 and VDM54-6000-R-3999

- Detection range: 0 – 6 m
- Aperture angle: horizontal ± 7.5 degrees; vertical ± 3.5 degrees
- Serial interface RS-485

The VDM54-6000-R/20/88/105 only communicates with the vehicle control system via the RS-485 interface. The control system software must have implemented the protocol for the VDM54-6000-R/20/88/105.

Advantages: Parameter settings are carried out via the control system. Should it be necessary to replace one VDM54 with another, no sensor adjustments are necessary.

4.1.3 LED indicators and control buttons

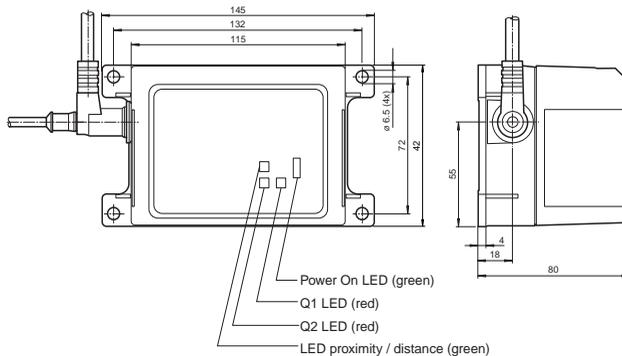


Figure 4.1: Dimensional drawing VDM54-6000-R/20/105

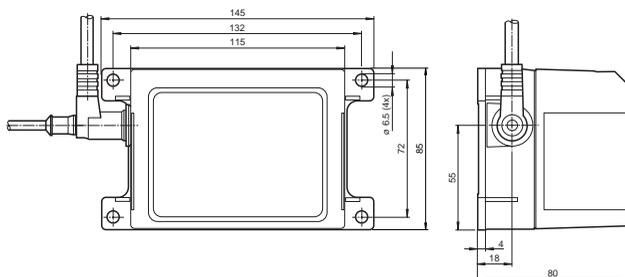


Figure 4.2: Dimensional drawing VDM54-6000-R/20/88/105 and VDM54-6000-R-3999

4.2 Scope of supply

The following is included with delivery:

- VDM54

4.3 Accessories

The following products are available as accessories:

No.	Part number	Diagram	Description
1	REFLEKTOR H100-2R		Reflector, square 100 mm x 100 mm
2	VDM54-CONFIGBOX		Programming accessory for VDM54

5 Installation

5.1 Storage and transportation

When packing the device for storage or transportation, use materials that will protect the device from jarring, impacts and humidity. The original packaging provides the best protection. Take into account the permitted ambient conditions as well.



If the device has been subjected to extreme temperature fluctuations during transportation, it must be allowed to acclimatize for approximately one hour before being installed and put into operation. Always prevent condensation from forming in or on the unit as this could result in internal components being damaged.

5.2 Unpacking

Check that the contents are not damaged. In case of damage, inform the postal service or delivery agent and notify the supplier.

Check the scope of delivery against your order and the delivery documents.

Keep the original packaging in case the device must be stored or shipped at a later date.

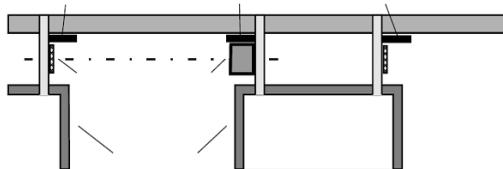
If you have any questions, please contact Pepperl+Fuchs.

5.3 Installation



Do not point the sensor directly at the sun. Always protect the sensor against direct and lengthy exposure to sunlight. Prevent the formation of condensation by not exposing the sensor to large fluctuations in temperature. Keep the sensor away from aggressive chemicals. Make sure that the glass and the reflector on the device are kept clean. Always use soft cloths and, if necessary, a commercial glass cleaner.

5.3.1 Installation/Mounting example



The illustration shows how the frame protects the VDM54 and reflector from damage when the vehicles are pushed together for servicing.

6 Commissioning

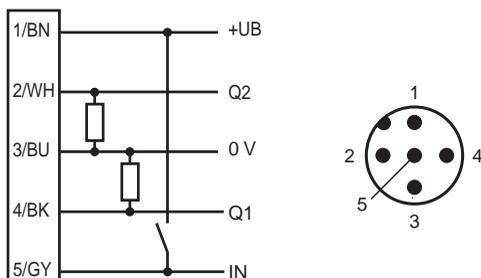
After the device is turned on, the VDM54 is ready for operation after completing an initialization phase of approx. 10 seconds.

To achieve maximum accuracy, allow the device to warm up for 10 minutes.

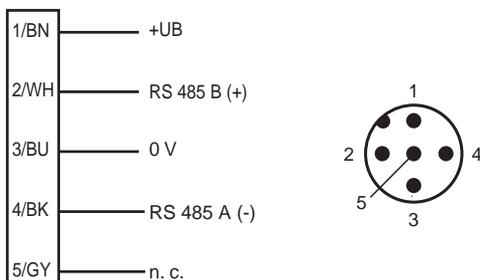
The sensor has been tested and calibrated before leaving the factory. It can be placed in operation immediately.

6.1 Device connections

Electrical connection and pin out of the VDM54-6000-R/20/105



Electrical connection and pin out of the VDM54-6000-R/20/88/105 and VDM54-6000-R-3999



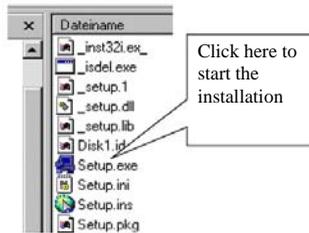
6.2 Alignment

Aim the VDM54 directly at the reflector(s).

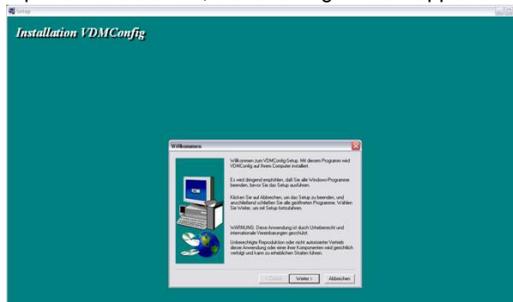
7 Software

7.1 Software installation

Switch points can be programmed from a PC. VDMConfig parameter software must be successfully installed on the appropriate device and a Pepperl+Fuchs **ConfigBox** is required. The **ConfigBox** is connected to the PC via RS-232 interface.



When the setup.exe file is started, the following window appears:



Follow the instructions on the screen until installation of VDMConfig is complete. Once VDMConfig has been successfully installed, the program can be started e.g. via the Windows Start button.

7.2 Programming with VDMConfig

In order to program settings on the VDM54 ensure that:

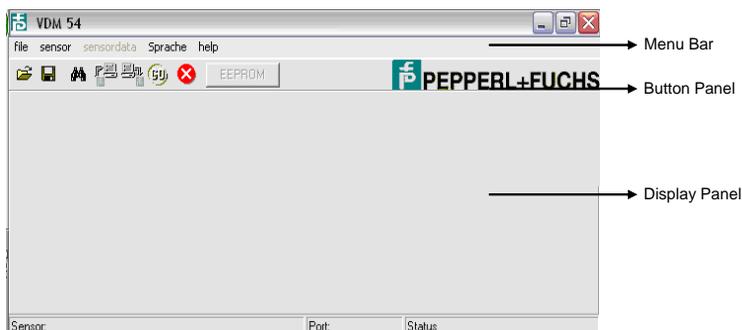
1. the VDM54 is connected to the power supply,
2. the VDM54 is connected to a free COM interface on the PC via the VDMConfig Box.
3. VDMConfig is installed on the PC.

When  is started, the VDMConfig start window appears:

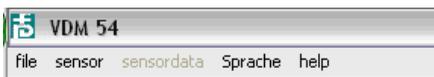


In the start window, please select VDM54 to open the main window.

The main window essentially consists of the menu bar, button bar, and display field.



Menu bar



- **File:**
Files can be opened and saved. Quit closes the program.

• **Sensor:**

The connected sensor type is selected here. Automatic or manual search are available as options. For a manual search, the following parameters must be entered for the VDM54:



• **Sensor data:**

Read current setting from sensor; send setting from VDMConfig to VDM54. Sensor online mode can be started. In online mode, the sensor periodically transfers measured data, which then appears in the display. If the option "continuously" is not activated, only one measured value is sent.

• **Help:**

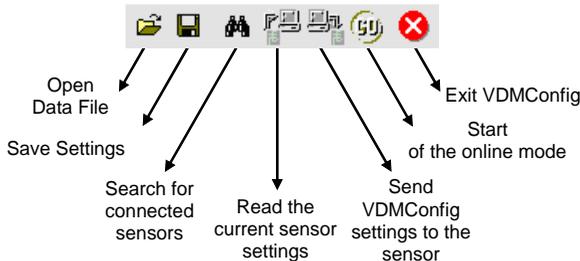
This displays the VDMConfig version along with error messages in the event of transmission errors.

• **Language:**

Choice of language; options: German / English

The use of VDMConfig is based on standard Microsoft Windows functions and is therefore mainly intuitive. Alterations in appearance are possible at any time in the course of an update or as the result of other Windows adjustments.

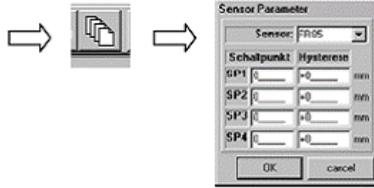
Button bar



Procedure for programming VDMConfig with data input

(to access graphic parameter input directly, press OK to exit)

1. Select sensor type and enter parameters directly.



2. Transfer parameters to sensor



Procedure for programming VDMConfig with settings from another sensor

1. Connect sensor with required setting using serial connection
2. Run an automatic sensor search



3. Read out setting from sensor



4. Disconnect sensor that has been read and connect sensor to be programmed in its place.

5. Transfer parameters to sensor



(Steps 4 and 5 can be repeated as many times as required without reconnecting sensor to be read)

8 Maintenance and repair

Maintenance

Observe the applicable regulations for servicing.

The sensor requires little or no maintenance.

Check the sensor system at regular intervals, in particular, check for damage to the housing.

To ensure that the sensor functions correctly, occasionally check the sensor for soiling. Regularly clean the sensor by wiping across it with a soft dry or moist cloth.

The housing is made of plastic. For this reason, avoid contact with acetone and detergents containing solvents.

Repair

If malfunctions cannot be eliminated, take the device out of service and secure it from accidental use. For repairs to the device, send the device to Pepperl+Fuchs. Only Pepperl+Fuchs can make repairs to the device. Interventions in and modifications to the device are not permissible, render the warranty null and void, and exclude the manufacturer from any liability.



9 Appendix

9.1 Notes



Part No. 210259

09/30/2009

Date of Issue

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FACTORY AUTOMATION – SENSING YOUR NEEDS



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