

Functional Safety

Relay Module

**K*D0-RSH-1.1E.1,
HiC5863(Y1)**

Manual

SIL

IEC 61508/61511



CE SIL 3

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"

Worldwide

Pepperl+Fuchs Group

Lilienthalstr. 200

68307 Mannheim

Germany

Phone: +49 621 776 - 0

E-mail: info@de.pepperl-fuchs.com

North American Headquarters

Pepperl+Fuchs Inc.

1600 Enterprise Parkway

Twinsburg, Ohio 44087

USA

Phone: +1 330 425-3555

E-mail: sales@us.pepperl-fuchs.com

Asia Headquarters

Pepperl+Fuchs Pte. Ltd.

P+F Building

18 Ayer Rajah Crescent

Singapore 139942

Phone: +65 6779-9091

E-mail: sales@sg.pepperl-fuchs.com

<https://www.pepperl-fuchs.com>

1	Introduction	5
1.1	Content of this Document	5
1.2	Safety Information	6
1.3	Symbols Used	7
2	Product Description	8
2.1	Function	8
2.2	Interfaces	8
2.3	Marking	8
2.4	Standards and Directives for Functional Safety	9
3	Planning	10
3.1	System Structure	10
3.2	Assumptions	11
3.3	Safety Function and Safe State	12
3.4	Characteristic Safety Values	13
3.5	Useful Lifetime	14
4	Mounting and Installation	15
4.1	Configuration	15
5	Operation	16
5.1	Proof Test	16
6	Maintenance and Repair	20
7	List of Abbreviations	21

1 Introduction

1.1 Content of this Document

This document contains information for usage of the device in functional safety-related applications. You need this information to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



Note

This document does not substitute the instruction manual.



Note

For full information on the product, refer to the instruction manual and further documentation on the Internet at www.pepperl-fuchs.com.



Note

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com.

The documentation consists of the following parts:

- Present document
- Instruction manual
- Manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- FMEDA report
- Assessment report
- Additional documents

For more information about Pepperl+Fuchs products with functional safety, see www.pepperl-fuchs.com/sil.

1.2 Safety Information

Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the product. The personnel must have read and understood the instruction manual and the further documentation.

Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

The device is developed, manufactured and tested according to the relevant safety standards.

Use the device only

- for the application described
- with specified environmental conditions
- with devices that are suitable for this safety application

Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols



Note

This symbol brings important information to your attention.



Action

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

2 Product Description

2.1 Function

General

This signal conditioner provides galvanic isolation between field circuits and control circuits. The energized to safe (ETS) function is permitted for SIL 3 applications. For testing of the relays, test terminals can be used. The test mode will be indicated by a LED.

KCD0-RSH-1.1E.1, KFD0-RSH-1.1E.1

The device is a relay module that is suitable for safely switching applications of a load circuit. The device isolates load circuits up to 230 V AC and the 24 V DC control circuit.

The device is mounted on a 35 mm DIN mounting rail according to EN 60715.

HiC5863

The device is a relay module that is suitable for safely switching applications of a load circuit. The device isolates load circuits up to 30 V and the 24 V control circuit.

This device mounts on a HiC termination board.

HiC5863Y1

The device is a relay module that is suitable for safely switching applications of a load circuit. The device isolates load circuits up to 230 V AC/30 V DC and the 24 V DC control circuit.

This device mounts on a HiC termination board.

2.2 Interfaces

The device has the following interfaces.

- Safety-relevant interfaces: input, output (ETS)
- The test input may **not** be used during normal operation. The test input may be used for test only.

Note

For corresponding connections see datasheet.



2.3 Marking

Pepperl+Fuchs Group Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

KFD0-RSH-1.1E.1, KCD0-RSH-1.1E.1 HiC5863, HiC5863Y1	Up to SIL 3
--	-------------

2.4 Standards and Directives for Functional Safety

Device specific standards and directives

Functional safety	IEC/EN 61508, part 1 – 7, edition 2010: Functional safety of electrical/electronic/programmable electronic safety-related systems (manufacturer)
-------------------	---

System-specific standards and directives

Functional safety	IEC 61511-1:2016+COR1:2016+A1:2017 EN 61511-1:2017+A1:2017 Functional safety – Safety instrumented systems for the process industry sector (user)
-------------------	---

3 Planning

3.1 System Structure

3.1.1 Low Demand Mode of Operation

If there are two control loops, one for the standard operation and another one for the functional safety, then usually the demand rate for the safety loop is assumed to be less than once per year.

The relevant safety parameters to be verified are:

- the PFD_{avg} value (average **P**robability of dangerous **F**ailure on **D**emand) and the T_1 value (proof test interval that has a direct impact on the PFD_{avg} value)
- the SFF value (**S**afe **F**ailure **F**raction)
- the HFT architecture (**H**ardware **F**ault **T**olerance)

3.1.2 High Demand or Continuous Mode of Operation

If there is only one safety loop, which combines the standard operation and safety-related operation, then usually the demand rate for this safety loop is assumed to be higher than once per year.

The relevant safety parameters to be verified are:

- the PFH value (**P**robability of dangerous **F**ailure per **H**our)
- Fault reaction time of the safety system
- the SFF value (**S**afe **F**ailure **F**raction)
- the HFT architecture (**H**ardware **F**ault **T**olerance)

3.1.3 Safe Failure Fraction

The safe failure fraction describes the ratio of all safe failures and dangerous detected failures to the total failure rate.

$$SFF = (\lambda_s + \lambda_{dd}) / (\lambda_s + \lambda_{dd} + \lambda_{du})$$

A safe failure fraction as defined in IEC/EN 61508 is only relevant for elements or (sub)systems in a complete safety loop. The device under consideration is always part of a safety loop but is not regarded as a complete element or subsystem.

For calculating the SIL of a safety loop it is necessary to evaluate the safe failure fraction of the elements and subsystems, but not of a single device.

Nevertheless the SFF of the device is given in this document for reference.

3.2 Assumptions

The following assumptions have been made during the FMEDA:

- Failure rates are constant, wear is not considered.
- Failure rate based on the Siemens standard SN 29500.
- The safety-related device is considered to be of type **A** device with a hardware fault tolerance of **0**.
- The device will be used under average industrial ambient conditions comparable to the classification **stationary mounted** according to MIL-HDBK-217F.

Alternatively, operating stress conditions typical of an industrial field environment similar to IEC/EN 60654-1 Class C with an average temperature over a long period of time of 40 °C may be assumed. For a higher average temperature of 60 °C, the failure rates must be multiplied by a factor of 2.5 based on experience. A similar factor must be used if frequent temperature fluctuations are expected.

- The nominal voltage at the digital input is 24 V. Ensure that the nominal voltage do not exceed 30 V under all operating conditions.
- The DO card must be able to supply a signal current of at least 100 mA.

Applications according to IEC/EN 61508

- To build a SIL safety loop for the defined SIL, it is assumed as an example that this device uses 10 % of the available budget for PFD_{avg}/PFH .
- For a SIL 3 application operating in low demand mode the total PFD_{avg} value of the SIF (**S**afety **I**nstrumented **F**unction) should be smaller than 10^{-3} , hence the maximum allowable PFD_{avg} value would then be 10^{-4} .
- For a SIL 3 application operating in high demand mode the total PFH value of the SIF should be smaller than 10^{-7} per hour, hence the maximum allowable PFH value would then be 10^{-8} per hour.
- If the device is used in applications for high demand mode, perform a risk analysis regarding systematic faults and implement suitable measures to control these systematic faults. For example, this can be the following measures:
 - usage of redundant power supplies,
 - monitoring of input signal, wiring and connections for short circuits and open circuits,
 - monitoring the output for open circuits.
- Since the safety loop has a hardware fault tolerance of **0** and it is a type **A** device, the SFF must be > 90 % according to table 2 of IEC/EN 61508-2 for a SIL 3 (sub) system.

Applications according to IEC/EN 62061 and EN/ISO 13849-1

- The standards IEC/EN 62061 and EN/ISO 13849-1 require that the safety device is implemented according to the idle current principle. As the device is implemented following the working current principle, no safety classification according to IEC/EN 62061 and EN/ISO 13849-1 was carried out. If you use the device in machinery safety applications, assess the specific application and show that an equivalent safety level will be achieved.

3.3 Safety Function and Safe State

Safety Function

The safety function of the device is defined: Whenever the input of the device is energized, the ETS output is conducting.

Safe State

In the safe state of the safety function the ETS output is closed (conducting).

Reaction Time

The reaction time is < 150 ms.

3.4 Characteristic Safety Values

Parameters	Characteristic values
Assessment type and documentation	Full assessment
Device type	A
Mode of operation	Low demand mode or high demand mode
Safety function	ETS
HFT	0
SIL	3
SC	3
λ_s	150 FIT
λ_{dd}	0 FIT
λ_{du}^1	2.21 FIT
λ_{total} (safety function)	152 FIT
SFF ²	98.6 %
MTBF ³	151 years
MTTF _d	> 2500 years
PTC	100 %
PFH	2.21×10^{-9} 1/h
PFD _{avg} for $T_1 = 5$ years	4.84×10^{-5}
PFD _{avg} for $T_1 = 10$ years	9.7×10^{-5}
T_1 max. ⁴	10 years

Table 3.1

¹ Only use the HiC5863 device in safety relevant applications with the following termination boards:

FC-GPCS-SDO08-PF
 SC-GPCS-UNI16-PF
 FC-GPCS-RIO16-PF
 HiCTB32-TRI-DOISS-EL-PL-Y1
 HiCTB16-TRI-DOISS-EL-PL-Y1
 HiCTB16-TRX-RAC-PL-IO16
 HiCTB16-YRS-RRB-AK-CC-DO16-Y1
 HiCTB16-SDC-24C-SC-RA
 HiCTB16-SCT-44C-SC-RA

Generally: Add 2.5 FIT to the overall failure rate for dangerous undetected failures.

Exception for HiCTB16-TRX-RAC-PL-IO16 Termination Board: Add 1.5 FIT to the overall failure rate for dangerous undetected failures.

Recalculate the necessary safety relevant values for your safety evaluation. Contact Pepperl+Fuchs for information on using other termination boards.

² The SFF value was not calculated according to IEC/EN 61508-2.

³ acc. to SN29500. This value includes failures which are not part of the safety function/MTTR = 8 h.

⁴ If the device claims less than 10 % of the signal loop budget, T_1 can be chosen higher.

The characteristic safety values like PFD, PFH, SFF, HFT and T_1 are taken from the FMEDA report. Observe that PFD and T_1 are related to each other.

The function of the devices has to be checked within the proof test interval (T_1).

3.5 Useful Lifetime

Although a constant failure rate is assumed by the probabilistic estimation this only applies provided that the useful lifetime of components is not exceeded. Beyond this useful lifetime, the result of the probabilistic estimation is meaningless as the probability of failure significantly increases with time. The useful lifetime is highly dependent on the component itself and its operating conditions – temperature in particular. For example, electrolytic capacitors can be very sensitive to the operating temperature.

This assumption of a constant failure rate is based on the bathtub curve, which shows the typical behavior for electronic components.

Therefore it is obvious that failure calculation is only valid for components that have this constant domain and that the validity of the calculation is limited to the useful lifetime of each component.

It is assumed that early failures are detected to a huge percentage during the installation and therefore the assumption of a constant failure rate during the useful lifetime is valid.

The standard EN/ISO 13849-1:2015 proposes a useful lifetime T_M of 20 years for devices used within industrial environments. Observe that the useful lifetime can be reduced if the device is exposed to the following conditions:

- highly stressful environmental conditions such as constantly high temperatures
- temperature cycles with high temperature differences
- permanent repeated mechanical stress (vibration)

As noted in DIN EN 61508-2:2011 note N3, appropriate measures taken by the manufacturer and plant operator can extend the useful lifetime.

Please note that the useful lifetime refers to the (constant) failure rate of the device. The effective life time can deviate from this.

The estimated useful lifetime is greater than the warranty period prescribed by law or the manufacturer's guarantee period. However, this does not result in an extension of the warranty or guarantee services. Failure to reach the estimated useful lifetime is not a material defect.

Derating

For the safety application, reduce the number of switching cycles or the maximum current. A derating to 2/3 of the maximum value is adequate.

Maximum Switching Power of Output Contacts

The useful lifetime is limited by the maximum switching cycles of the relays under load conditions.

For requirements regarding the connected output load, refer to the documentation of the connected peripheral devices.

Note

See corresponding datasheets for further information.



4 Mounting and Installation



Mounting and Installing the Device

1. Observe the safety instructions in the instruction manual.
2. Observe the information in the manual.
3. Observe the requirements for the safety loop.
4. Connect the device only to devices that are suitable for this safety application.
5. Check the safety function to ensure the expected output behavior.

4.1 Configuration

A configuration of the device is not necessary and not possible.

5 Operation



Danger!

Danger to life from missing safety function

If the safety loop is put out of service, the safety function is no longer guaranteed.

- Do not deactivate the device.
- Do not bypass the safety function.
- Do not repair, modify, or manipulate the device.



Operating the device

1. Observe the safety instructions in the instruction manual.
2. Observe the information in the manual.
3. Use the device only with devices that are suitable for this safety application.
4. Correct any occurring safe failures within 8 hours. Take measures to maintain the safety function while the device is being repaired.

5.1 Proof Test

This section describes a possible proof test procedure. The user is not obliged to use this proposal. The user may consider different concepts with an individual determination of the respective effectiveness, e. g. concepts according to NA106:2018.

According to IEC/EN 61508-2 a recurring proof test shall be undertaken to reveal potential dangerous failures that are not detected otherwise.

Check the function of the subsystem at periodic intervals depending on the applied PFD_{avg} in accordance with the characteristic safety values. See chapter 3.4.

It is under the responsibility of the plant operator to define the type of proof test and the interval time period.

Check the settings after the configuration by suitable tests.

Equipment required:

- Use a digital multimeter (without special accuracy) as ohmmeter (mid range recommended) to check the relay contact outputs. Closed contacts are shown with 0Ω (low impedance). Open contacts are shown with OL (overload/high impedance).
- Power supply set to nominal voltage of 24 V DC



Proof Test Procedure

1. Disconnect the field circuit.
2. Check the device as shown in the following tables.
3. After check reset the device to the necessary settings.
4. Connect the field circuit again.
5. Check the correct behavior of the safety loop. Is the configuration correct?

Test No.	Input or Test Input	Output (mA)
1	$V_{Test\ 1} = 24\ V\ DC$ between terminals 10+ and 9-	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): shows $< 10\ \Omega$ • LED TST is flashing
2	$V_{Test\ 2} = 24\ V\ DC$ between terminals 11+ and 9-	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): shows $< 10\ \Omega$ • LED TST is flashing
3	$V_{Test\ 3} = 24\ V\ DC$ between terminals 12+ and 9-	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): shows $< 10\ \Omega$ • LED TST is flashing
4	$V_{Test} = 24\ V\ DC$ between terminals 10+, 11+, 12+ and 9-	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): shows $< 10\ \Omega$ • LED TST is flashing
5	$V_{Test} = 0\ V\ DC$ between terminals 10+, 11+, 12+ and 9-	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): OL (overload) • LED TST is off
6	$V_{input} = 24\ V\ DC$ between terminals 7+ and 8- with regular input polarity between terminals 7- and 8+ with inverted input polarity	<ul style="list-style-type: none"> • ETS output (terminals 2, 3): shows $< 10\ \Omega$ • LED OUT is on

Table 5.1 Expected test results for the proof test of KFD0-RSH-1.1E.1

Test No.	Input or Test Input	Output (mA)
1	$V_{Test1} = 24\text{ V DC}$ between terminals 7+ and 8-	<ul style="list-style-type: none"> ETS output (terminals 1, 2): shows $< 10\ \Omega$ LED TST is flashing
2	$V_{Test2} = 24\text{ V DC}$ between terminals 9+ and 8-	<ul style="list-style-type: none"> ETS output (terminals 1, 2): shows $< 10\ \Omega$ LED TST is flashing
3	$V_{Test3} = 24\text{ V DC}$ between terminals 10+ and 8-	<ul style="list-style-type: none"> ETS output (terminals 1, 2): shows $< 10\ \Omega$ LED TST is flashing
4	$V_{Test} = 24\text{ V DC}$ between terminals 7+, 9+, 10+ and 8-	<ul style="list-style-type: none"> ETS output (terminals 1, 2): shows $< 10\ \Omega$ LED TST is flashing
5	$V_{Test} = 0\text{ V DC}$ between terminals 7+, 9+, 10+ and 8-	<ul style="list-style-type: none"> ETS output (terminals 1, 2): OL (overload) LED TST is off
6	$V_{input} = 24\text{ V DC}$ between terminals 5+ and 6- with regular input polarity between terminals 5- and 6+ with inverted input polarity	<ul style="list-style-type: none"> ETS output (terminals 1, 2): shows $< 10\ \Omega$ LED OUT is on

Table 5.2 Expected test results for the proof test of KCD0-RSH-1.1E.1

Test No.	Input or Test Input	Output (mA)
1	$V_{Test} = 24\text{ V DC}$ between terminals 3b+ and 3a-	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): shows $< 10\ \Omega$ LED TST is flashing
2	$V_{Test} = 24\text{ V DC}$ between terminals 4a+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): shows $< 10\ \Omega$ LED TST is flashing
3	$V_{Test} = 24\text{ V DC}$ between terminals 4b+ and 3a-	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): shows $< 10\ \Omega$ LED TST is flashing
4	$V_{Test} = 24\text{ V DC}$ between terminals 4a+, 3b+, 4b+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): shows $< 10\ \Omega$ LED TST is flashing
5	$V_{Test} = 0\text{ V DC}$ between terminals 4a+, 3b+, 4b+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): OL (overload) LED TST is off
6	$V_{input} = 24\text{ V DC}$ between terminals 8a+ and 7a- with regular input polarity	<ul style="list-style-type: none"> ETS output (terminals 5a, 5b): shows $< 10\ \Omega$ LED OUT is on

Table 5.3 Expected test results for the proof test of HiC5863

Test No.	Input or Test Input	Output (mA)
1	$V_{Test} = 24 \text{ V DC}$ between terminals 3b+ and 3a-	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): shows $< 10 \Omega$ LED TST is flashing
2	$V_{Test} = 24 \text{ V DC}$ between terminals 4a+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): shows $< 10 \Omega$ LED TST is flashing
3	$V_{Test} = 24 \text{ V DC}$ between terminals 4b+ and 3a-	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): shows $< 10 \Omega$ LED TST is flashing
4	$V_{Test} = 24 \text{ V DC}$ between terminals 4a+, 3b+, 4b+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): shows $< 10 \Omega$ LED TST is flashing
5	$V_{Test} = 0 \text{ V DC}$ between terminals 4a+, 3b+, 4b+, and 3a-	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): OL (overload) LED TST is off
6	$V_{input} = 24 \text{ V DC}$ between terminals 8a+ and 7a- with regular input polarity	<ul style="list-style-type: none"> ETS output (terminals 1a, 5a): shows $< 10 \Omega$ LED OUT is on

Table 5.4 Expected test results for the proof test of HiC5863Y1

Only if all tests are successfully done, the proof test is successful.

6 Maintenance and Repair



Danger!

Danger to life from missing safety function

Changes to the device or a defect of the device can lead to device malfunction. The function of the device and the safety function is no longer guaranteed.

Do not repair, modify, or manipulate the device.



Maintaining, Repairing or Replacing the Device

In case of maintenance, repair or replacement of the device, proceed as follows:

1. Implement appropriate maintenance procedures for regular maintenance of the safety loop.
2. While the device is maintained, repaired or replaced, the safety function does not work. Take appropriate measures to protect personnel and equipment while the safety function is not available. Secure the application against accidental restart.
3. Do not repair a defective device. A defective device must only be repaired by the manufacturer.
4. If there is a defect, always replace the device with an original device.



Reporting Device Failure

If you use the device in a safety loop according to IEC/EN 61508, it is required to inform the device manufacturer about possible systematic failures.

Report all failures in the safety function that are due to functional limitations or a loss of device function – especially in the case of possible dangerous failures.

In these cases, contact your local sales partner or the Pepperl+Fuchs technical sales support (service line).

It is not necessary to report failures in the safety function that are due to external influences or damage.

7 List of Abbreviations

ESD	Emergency Shutdown
FIT	Failure In Time in 10^{-9} 1/h
FMEDA	Failure Mode, Effects, and Diagnostics Analysis
λ_s	Probability of safe failure
λ_{dd}	Probability of dangerous detected failure
λ_{du}	Probability of dangerous undetected failure
$\lambda_{no\ effect}$	Probability of failures of components in the safety loop that have no effect on the safety function.
$\lambda_{not\ part}$	Probability of failure of components that are not in the safety loop
$\lambda_{total\ (safety\ function)}$	Probability of failure of components that are in the safety loop
HFT	Hardware Fault Tolerance
MTBF	Mean Time Between Failures
MTTR	Mean Time To Restoration
PCS	Process Control System
PFD_{avg}	Average Probability of dangerous Failure on Demand
PFH	Average frequency of dangerous failure per hour
PLC	Programmable Logic Controller
PTC	Proof Test Coverage
SC	Systematic Capability
SFF	Safe Failure Fraction
SIF	Safety Instrumented Function
SIL	Safety Integrity Level
SIS	Safety Instrumented System
T_1	Proof Test Interval
B_{10d}	Number of switching cycles until 10 % of the components fail dangerously
DC	Diagnostic Coverage of dangerous faults
MTTF_d	Mean Time To dangerous Failure
PL	Performance Level
DPS	Dual Pole Switching
DTS	De-energized To Safe function
ETS	Energized To Safe function

Your automation, our passion.

Explosion Protection

- Intrinsic Safety Barriers
- Signal Conditioners
- FieldConnex® Fieldbus
- Remote I/O Systems
- Electrical Ex Equipment
- Purge and Pressurization
- Industrial HMI
- Mobile Computing and Communications
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement

Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Fieldbus Modules
- AS-Interface
- Identification Systems
- Displays and Signal Processing
- Connectivity

Pepperl+Fuchs Quality

Download our latest policy here:

www.pepperl-fuchs.com/quality

