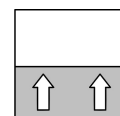


Operating manual

ER76

Control relay for level probes
DNV-GL version

09015289 • BA_EN_ER76 • Rev. ST4-D • 10/23



Masthead

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Subject to technical amendments.



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Version history

Rev. ST4-A 10/20	Version 1 (first edition)
Rev. ST4-B 04/21	Version 2 (new housing)
Rev. ST4-C 07/21	Version 3 (CE declaration updated)
Rev. ST4-D 10/23	Version 4 (DNV certificate updated)

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1 Safety instructions

1.1 General

This operating manual contains basic instructions for the installation, operation and maintenance of the device that must be followed without fail. It must be read by the installer, the operator and the responsible specialist personnel before installing and commissioning the device.

This operating manual is an integral part of the product and therefore needs to be kept close to the instrument in a place that is accessible at all times to the responsible personnel.

The following sections, in particular instructions about the assembly, commissioning and maintenance, contain important information, non-observance of which could pose a threat to humans, animals, the environment and property.

The instrument described in these operating instructions is designed and manufactured in line with the state of the art and good engineering practice.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

The supplier of the equipment will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions governing correct operation of the instrument must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. See the information in the applicable national and international regulations.

Please observe the information about certification and approvals in the Technical Data section.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Only the manufacturer is authorised to make any modifications or changes.

1.6 Inadmissible Modes of Operation

The operational safety of this instrument can only be guaranteed if it is used as intended. The instrument model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

The manufacturer is not liable for damage resulting from improper or incorrect use.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation



DANGER

Type and source of danger

This indicates a **direct** dangerous situation that could lead to death or **serious injury** (highest danger level).

1. Avoid danger by observing the valid safety regulations.



WARNING

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to death or **serious injury** (medium danger level).

1. Avoid danger by observing the valid safety regulations.



CAUTION

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to slight or serious injury, damage or **environmental pollution** (low danger level).

1. Avoid danger by observing the valid safety regulations.



NOTICE

Note / advice

This indicates useful information of advice for efficient and smooth operation.

2 Product and functional description

2.1 Delivery scope

- ER76 according to specification (see order code)
- Operating Manual

2.2 Device versions

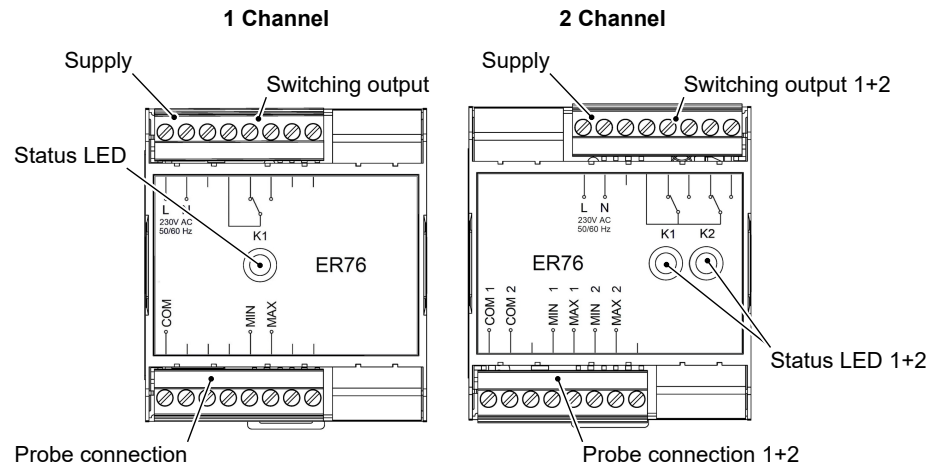


Fig. 1: Device versions

Bestellnummer	Switch output	Supply U_b
ER76 1 000000 1	1 relay contact	230 V AC
ER76 1 000000 4	1 relay contact	24 V AC
ER76 2 000000 1	2 relay contacts	230 V AC
ER76 2 000000 4	2 relay contacts	24 V AC

2.2.1 Type plate

This type plate serves as an example of the information that is stated. The data shown is purely fictive, but does correspond to the actual conditions. For more information, please see the order code at the end of these instructions.

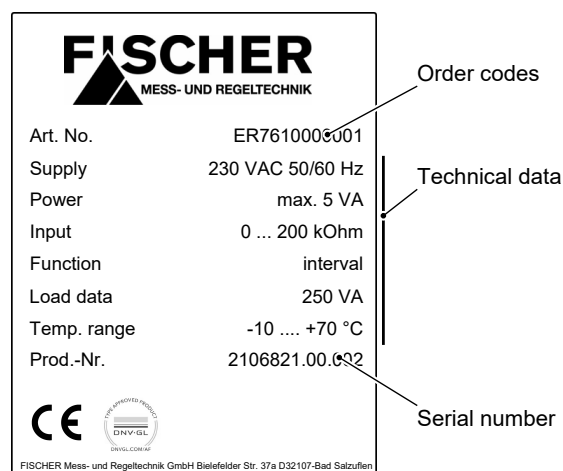


Fig. 2: Type plate

2.3 Intended use

Control relay ER76 can be used in connection with type NK06 level probes for the automatically controlling and regulating conductive liquid filling levels in tank systems.

2.4 Function diagram

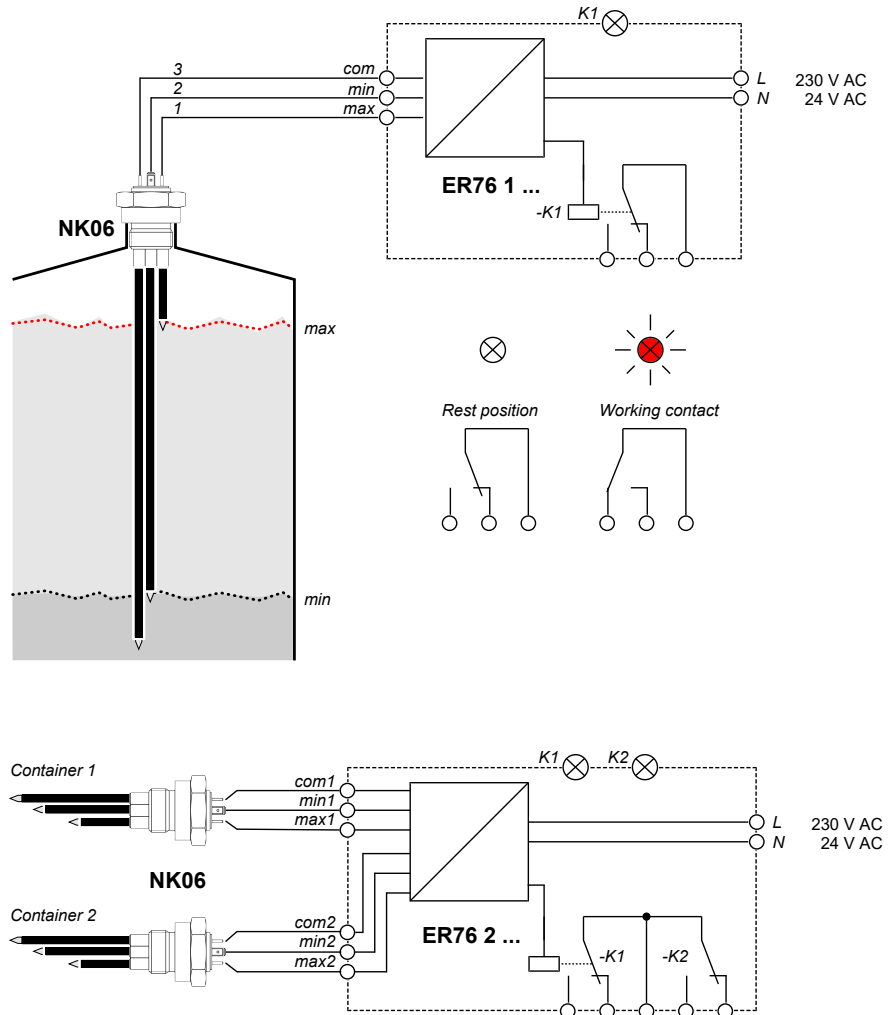


Fig. 3: Function diagram

2.5 Design and mode of operation

ER76 is controlled by the medium using a type NK06 probe. Input sensitivity is factory-adjusted to 70 k Ω . In order for the relay to switch properly, the medium-conductivity must not fall below a value of 14 μ S / cm.

When contact is made, an alternating voltage without a direct voltage component flows through the medium, preventing galvanic erosion of the probe material.

Depending on the application, location or national regulations, the control electrodes' reference potential can be represented by a common electrode as well as by the container itself.

After the level probe has been installed and the control relay has been electrically connected, the contact switches to the working position. LED is on.

If the maximum level is reached, the output relay switches to the rest position. LED is off. This state remains until the level falls below the minimum level and the contact switches to the working position again.

If the supply voltage fails, there is a defect in the control circuit or an interruption in the measuring line, the system goes into the safe state (normally closed contact) and thus prevents the container from being overfilled.

3 Assembly

3.1 General



⚠ CAUTION

Risks connected to medium or system

The builder or operator of the tank system must take suitable protective measures for installation and maintenance.

3.2 Electrical connection

- By authorized and qualified specialized personnel only.
- When connecting the unit, the national and international electro-technical regulations must be observed.
- Disconnect the system from the mains, before electrically connecting the device.
- Install the consumer-adapted fuses.
- Do not connect the connector if strained.

3.2.1 ER76 with one relay

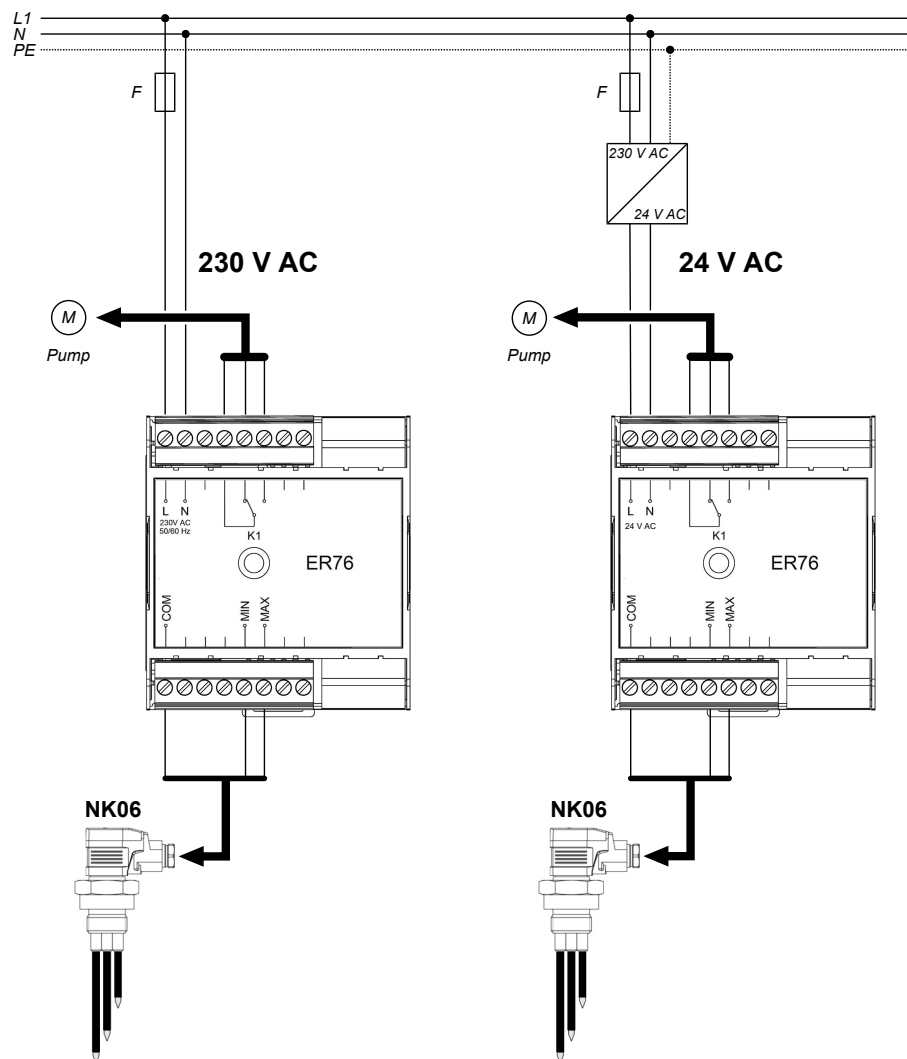


Fig. 4: Automatic level control with a relay (example)

ER76 switch output does not necessarily have to be used for direct pump control. It can also be used as a monitoring signal for an electronic control system.

3.2.2 ER76 with two relays

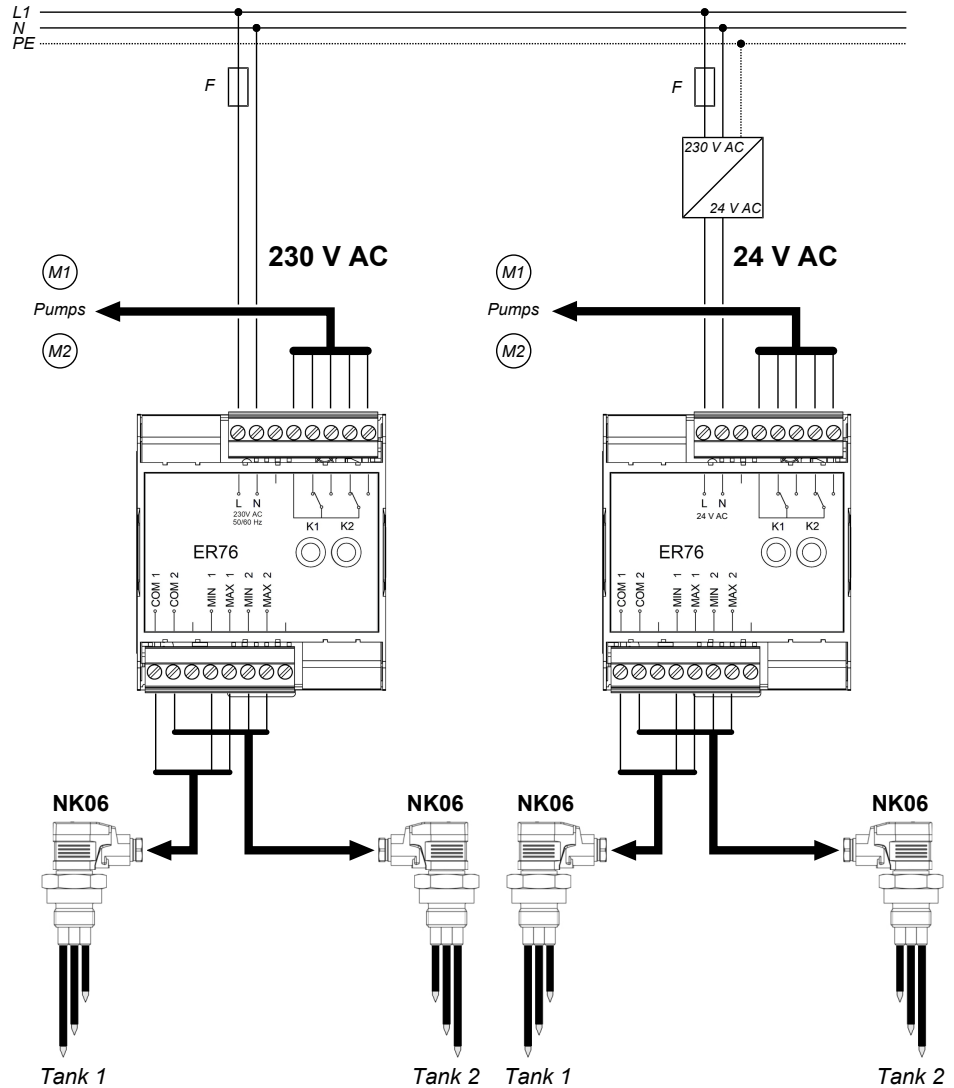


Fig. 5: Automatic level control with two relays (example)

With the ER76... two containers can be monitored with one relay. One possible application would be, for example, controlling a tank for crude oil dewatering and a storage tank for separated water at the same time.

Here, too, switch outputs can be used as monitoring signals for an electronic control system.

4 Start-up

Proper installation of all electrical supply and signal lines is a prerequisite for commissioning. All connections are arranged so that there are no mechanical forces acting on the device.

ER76 is a control relay for NK06 conductive level probes. Please check the tank system for leaks before commissioning.

The function test for the ER76 with one relay is described below. For devices with two relays, the second channel works the same as the first channel.

Function test:

1. Switch on the ER76 supply.
 - Relay K1 switches and the associated LED lights up.
 2. Fill the tank until the maximum filling level is reached.
 - Relay K1 drops out and the associated LED goes out.
 3. Empty the tank until it falls below the minimum level.
 - Relay K1 switches and the associated LED lights up.
- This ends the function test.

Malfunctions

ER76 control relay is a very reliable device. If an error occurs during commissioning, first check the electrical connections. A cable may be mixed up or there is an interruption.

5 Servicing

5.1 Maintenance

The instrument is maintenance-free. We recommend the following regular inspection to guarantee reliable operation and a long service life:

- Check the function in combination with downstream components.
- Check the electrical connections.

The exact test cycles need to be adapted to the operating and environmental conditions. In combination with other devices, the operating instructions for the other devices also need to be observed.

5.2 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

5.3 Service

All defective or faulty devices should be sent directly to our repair department. Please coordinate all shipments with our sales department.



WARNING

Process media residues

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

5.4 Disposal

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

6 Technical data

6.1 General

Type designation	ER76
Inputs for conductive probes	1 or 2
Switch outputs	1 or 2
Measurement principle	Conductive

6.2 Input variables

Measuring range	The measuring range (fill level) is determined by the connected conductive probe.
Input signal COM, MIN, MAX	Probe rods covered: A current flows between the rods. Probe rods uncovered: No current flows between the rods.

Adjustment range Set		
Input sensitivity	0 ... 200 kΩ	70 kΩ
Medium conductivity	---	≥ 14 μS/cm

Input sensitivity is preset at the factory and cannot be changed on site.

6.3 Output sizes

Switching function	2-point controller
Switch output	1 or 2 potential-free changeover contacts
Max. switching voltage	250 V AC
Max. switching current	2 A
Max. switching output	250 VA
Switching status display	LED

6.4 Auxiliary energy

Nominal voltage	230 V AC 24 V AC
Absorbed power	Max. 5 VA

6.5 Operating conditions

Ambient temperature range	-10 °C ... +70 °C
Storage temperature range	-10 °C ... +70 °C
Housing protection class	IP40
Terminal protection class	IP20
NSR	EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
EMC	EN 61326-1:2013 EN 61326-2-3:2013
RoHS	EN IEC 63000:2018
DNV-GL	On all vessels in accordance with the provisions of the DNVGL (class guideline: DNVGL-CG-339) Certificate No. TAA00001ZU

6.6 Construction design

Electrical connection	Screw terminals	
Installation position	User-defined	
Assembly ^{*)}	Assembly of the mounting rails	
Dimensions	68 x 75 x 110 mm	
Weight (max.)	280 g	ER76 1-Channel
	380 g	ER76 2-Channel

^{*)} A cut-to-size mounting rail and end clamps are available as accessories for wall mounting.

6.6.1 Materials

Housing	Polycarbonate / acrylonitrile butadiene styrene (ABS-PC)
Terminals	Polyamide (PA), Cu alloy

6.6.2 Dimension drawing

All dimensions in mm unless otherwise stated

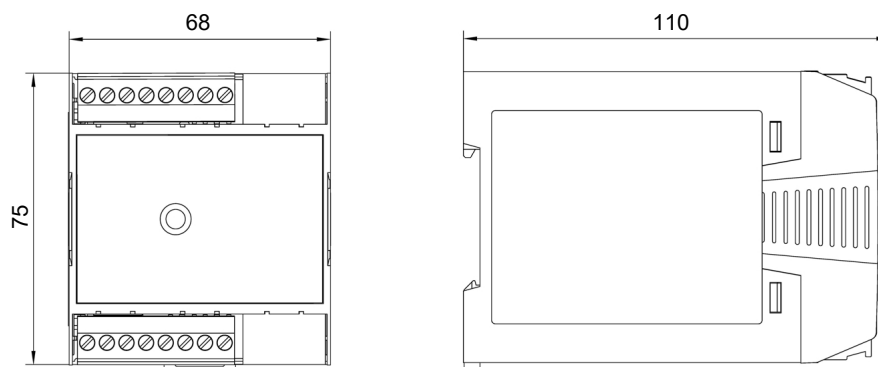
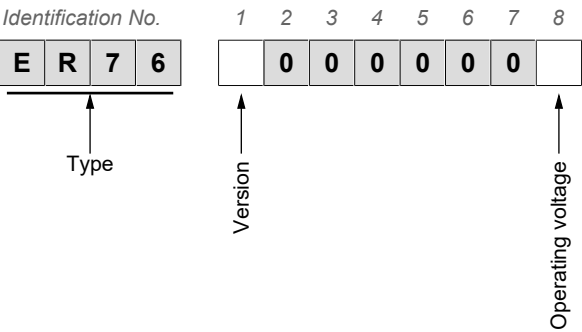


Fig. 6: Dimension drawing ER76 1 channel

The 2-channel version has the same dimensions.

7 Order codes



Design:

[1]	(Code no.)
1	1-way relay
2	2-way relay

Operating voltage:

[8]	(Code no.)
1	230 V AC
4	24 V AC

7.1 Accessories

Order no.	Discription
NK06	Conductive level probe
09001380	35 mm mounting rail perforated; 122 mm long
09001479	End clamp 6mm wide

8 Attachment



(Translation) **CE**

EU Declaration of Conformity

For the product described as follows

Product name Control relay for level probes
Type designation ER76

it is hereby declared that it corresponds with the basic requirements specified in the following designated directives:

2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS Directive
(EU) 2015/863	Delegated Directive amending Annex II to Directive 2011/65/EU

The products were tested in compliance with the following standards.

Electromagnetic compatibility (EMC)

DIN EN 61326-1:2013-07 EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
DIN EN 61326-2-3:2013-07 EN 61326-2-3:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

Low Voltage Directive (LVD)

DIN EN 61010-1:2020-03 EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
--	--

RoHS Directive (RoHS 3)

DIN EN IEC 63000:2019-05 EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
--	--

Further applied technical specifications (not published in the Official Journal of the European Union):

DIN EN 60945:2003-07 EN 60945:2002	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results (IEC 60945:2002)
DNVGL-CG-0339	Environmental test specification for electrical, electronic and programmable equipment and systems

Also they were subjected to the conformity assessment procedure „Internal production control“.

Sole responsibility for the issue of this declaration of conformity in relation to fulfilment of the fundamental requirements and the production of the technical documents is with the manufacturer.

Manufacturer FISCHER Mess- und Regeltechnik GmbH
 Bielefelder Str. 37a
 32107 Bad Salzungen, Germany
 Tel. +49 (0)5222 974 0

Documentation representative Torsten Malischewski
 General Manager R&D

The devices are marked with:



Bad Salzungen
 30 April 2021

G. Gödde
 Managing Director

09010399 • CE EN ER76 • Rev. ST4-B • 04/21



1 / 1

Fig. 7: CE_DE_ER76



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00001ZU
Revision No:
1

This is to certify:

That the Electrical Measuring and Protection Relay

with type designation(s)
ER 76 1000000X, ER 76 2000000X

Issued to

Fischer Meß- und Regeltechnik GmbH
Bad Salzuflen, Nordrhein-Westfalen, Germany

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature	B
Humidity	B
Vibration	A
EMC	B
Enclosure	A (IP20)

Issued at **Hamburg** on **2023-09-19**

This Certificate is valid until **2028-09-25**.

DNV local unit: **Essen**

Approval Engineer: **Holger Jansen**

for **DNV**



Digitally Signed By: Papanuskas, Joannis
Location: DNV GL SE Hamburg, Germany

Joannis Papanuskas
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2022-12

www.dnv.com

Page 1 of 2

Fig. 8: TAA00001ZU-page_1



Job Id: 262.1-029417-2
Certificate No: TAA00001ZU
Revision No: 1

Product description

Type: ER 76 1000000X, ER 76 2000000X

Level Limit Control Relay for Rod Electrodes

ER 76 1000000X for one channel
ER 76 2000000X for two channels

Output (ER 76 1):	1 common, 1 NO, 1NC – contact
Output (ER 76 2):	1 common, 2 NO, 2NC – contacts
Contact rating (maximal):	250V AC, 2A
	250VA / 50W
Input per channel:	1 common, 1 min., 1 max.
Power supply:	X = 1: 230 V AC
	X = 2: 115 V AC
	X = 3: 48 V AC
	X = 4: 24 V AC

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and Monitoring Systems.

Type Approval documentation

Data sheet: ER76 no. 09015288, DB_EN_ER76 Rev. ST4-B (04/21)
 Operation Manucl: ER76 no. 09015289, BA_EN_ER76 Rev. ST4-C (07/21)
 Drawings acc. to Master data lists 046539.** (2008-01-15) and 46540.** (2008-01-17)
 Test report: Phoenix no. 2077 (1997-04-09)
 Phoenix Testlab no. E221940E1 (2023-01-20)
 Fischer (1997-05-26) + Supplement FH Flensburg (2003-04-17)
 Type Approval Assessment Report 2023-08-22

Tests carried out

Applicable tests according to Class Guideline DNV-CG-0339, Edition August 2021.

Marking of product

The products to be marked with:

- manufacturer name
- type name
- serial number

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

Notes



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