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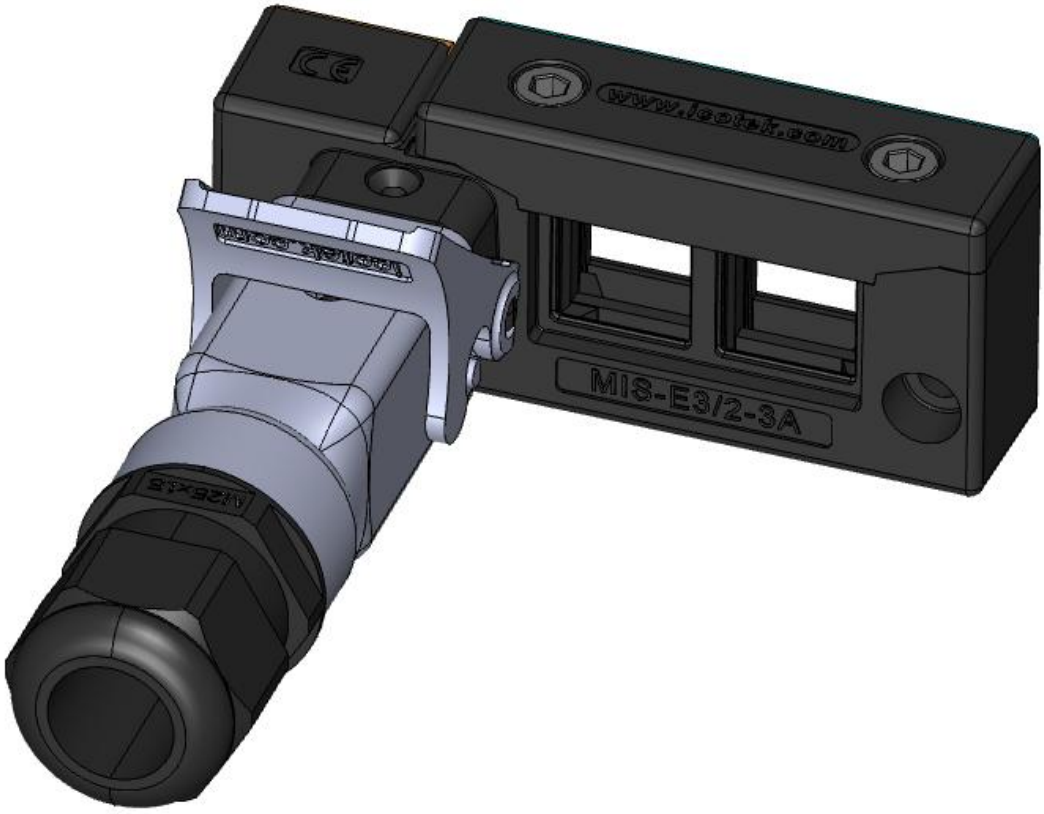
RISK ASSESSMENT

connector including cable entry system



CE

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Product:	connector including cable entry system
Productnumber :	see nameplate
Year of construction:	2023
Version of the Risk assessment :	2
Date of issue of the Risk assessment :	21.11.2023
Information gathered on:	06.10.2023
Participating manufacturers or operators:	Mr. Florian Ocker (Fa. icotek GmbH & Co. KG)
Participants TD CE:	Nikolaj Schatalow, Technical Documentation CE
Location:	The information was collected by telephone and email (TD CE information collection form).

Contents

List of illustrations

1 Introduction

1.1 Explanations regarding Risk assessment and risk evaluation

A risk assessment is carried out in accordance with the requirements of the Low Voltage Directive 2014/35/EU. The hazard list used to identify the hazards is a compilation of all possible hazards in accordance with the standard EN ISO 12100.

A design in accordance with EN 61984, EN IEC 60664-1, EN 60529 and current state of the art is also required.

The cable entry system with connector enables electrical conductors to be connected securely. Connectors must not be plugged in or disconnected while live. When unplugged, the connector must be de-energized.

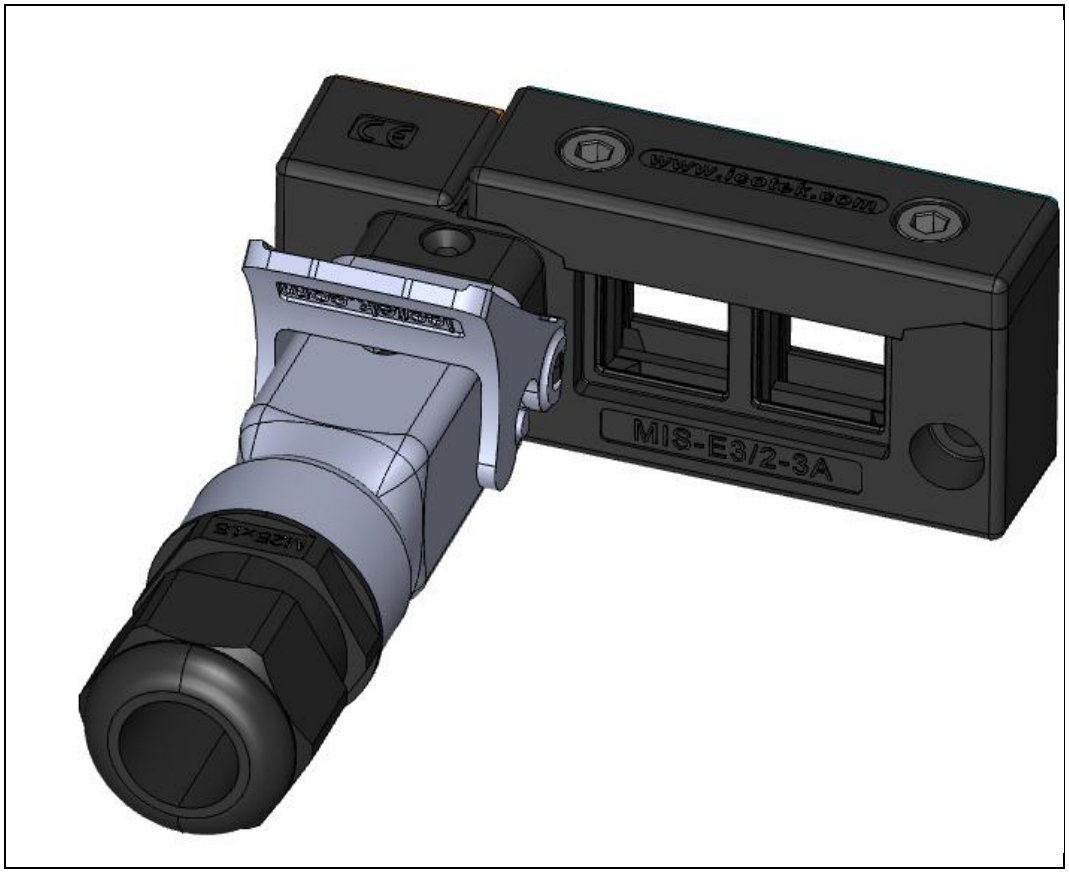

Figure 1: Layout of the connector including cable entry system

1.1.1 Reference EN 61984, EN IEC 60664-1, EN 60529

The Risk assessment does not include testing of the electrical equipment or the electrical safety concept of the connector including cable entry system**.** It is assumed that the electrical equipment has been tested and documented by a qualified person from the manufacturer in accordance with the requirements of the Low Voltage Directive 2014/35/EU and EN 61984, EN IEC 60664-1 and EN 60529.

1.1.2 Note on the safety concept

The security concept is developed by icotek GmbH. In the Risk assessment , each hazard is evaluated to determine whether its risk has been sufficiently reduced. If a risk has not been sufficiently reduced, recommendations or specifications are described in the "Summary" section.

The risk assessment is based on subjective considerations. There is no defined threshold at which hazard reduction measures must be implemented. The manufacturer bears sole responsibility in this regard. It should be noted that a higher risk justifies a greater effort in finding a suitable safety solution. The Risk assessment was moderated and documented by Technical Documentation CE. Technical Documentation CE does not determine the condition of the item under assessment in the capacity of an expert or appraiser. The final Productis accepted and approved by the client and published on their behalf.

The Risk assessment excludes the following: Measurements / tests according to Low Voltage Directive 2014/35/EU and EN 61984, EN IEC 60664-1 and EN 60529.

The contents of the Risk assessment are based on the information provided in the CE Technical Documentation and whose accuracy has been verified by icotek GmbH.

1.1.3 Note - Integration into another system unknown

The connector including cable entry system was inspected based on the supplied connector including cable entry system and the CE technical documentation. connector including cable entry systema larger product. This integration may result in hazards at the interfaces with other components that Risk assessment

1.1.4 Note on the implementation of the risk assessment

We strongly recommend that the Risk assessment before the actual commissioning of the connector including cable entry system to compare with the actual circumstances and, if necessary, to make improvements or have improvements made.

1.1.5 Note: Purchased components

It is assumed that the connector including cable entry system consists of purchased components that have been CE marked by the manufacturer or have an EU declaration of conformity and are not considered here due to the presumption of conformity.

The table below lists all purchased components. It also indicates whether a CE marking or an EU declaration of conformity is present.

The individual components of the connector including cable entry system Manufacturer documentation must be available. The absence of instructions is considered a safety hazard.

The individual components of the connector including cable entry system EU declarations of conformity from the manufacturers are available :

Components of the connector including cable entry system	EC/EU Declaration of Conformity / Declaration of Installation / Technical Documentation
Connectors / SUZHOU WEVEL ELECTRICAL CO., LTD.	x
Cable entry / Company icotek GmbH	(File data sheets, test reports, etc.)

1.2 Classification of industrial connectors with regard to CE marking

Within the European Single Market, there is some uncertainty regarding when so-called "industrial connectors" and their components must be CE marked in accordance with the Low Voltage Directive 2014/35/EU.

The ZVEI (German Electrical and Electronic Manufacturers' Association) interpretation paper is used to aid in the classification. The ZVEI represents the common interests of the electrical and digital industries in Germany and internationally.

This interpretation paper is intended to provide manufacturers with guidance and decision criteria when they need to answer this question for their respective products.

A total of 4 possible cases are discussed:

1.2.1 Case 1

Intended operating voltage outside the voltage limits of the Low Voltage Directive:

Many industrial connectors used in electronics and data technology are designed for operation at voltages below 50 V AC and 75 V DC. The Low Voltage Directive does not generally apply to such products. The same applies to medium- and high-voltage connectors for voltages above 1000 V AC and 1500 V DC. **These do not bear** CE marking according to the Low Voltage Directive.

After consultation with icotek GmbH, case 1 is not applicable for the connector including cable entry system.

1.2.2 Case 2

Product safety can only be assessed after installation:

Connectors designed for internal installation in devices, such as many PCB connectors, typically lack touch protection and other essential safety features. Safety is only achieved through installation within the device in its specific application and within the surrounding structure, and can only be assessed based on the installation method. Therefore, according to the EU guidelines, these are generally considered basic components not covered by the Low Voltage Directive. Consequently, they do **not** bear CE marking in accordance with the Low Voltage Directive.

After consultation with icotek GmbH, case 2 is not applicable for the connector including cable entry system.

1.2.3 Case 3

Connectors only available as individual parts in a modular system:

Heavy-duty industrial connectors, in particular, are often sold by the connector manufacturer as individual components. The user (plant or machine builder) selects different variants of housing, cable entry, base body, and contact elements from a catalog according to their application and assembles them themselves. In this case, safety is primarily ensured by the correct selection and assembly of the individual parts, which is the user's responsibility and over which the manufacturer of these individual parts has no influence. However, some connector components already incorporate assessable design safety features that the user cannot modify as intended. These include, for example, protective conductor connections, housing sealing, insulation resistance, and similar features. If such assessable safety features are present and the intended operating voltage is within the limits of the Low Voltage Directive, this directive applies to the corresponding components. If either of these two criteria is not met, the directive does not apply. Some safety features of a component are not inherent in the component itself, but only through its combination with a defined mating component. This applies, for example, to the sealing of an upper housing component according to IP protection ratings, which is only achieved when it is attached to a suitable lower housing component. The Higher Regional Court of Cologne ruled in this regard that the assessment of a single housing component is considered to be valid even if a dummy component is used as a counterpart for testing. The decision as to whether actually assessable safety features are present is the responsibility of the manufacturer in each individual case. CE marking according to the Low Voltage Directive depends on the product characteristics.

After consultation with icotek GmbH, case 3 applies to the connector including cable entry system.

1.2.4 Case 4

Complete connectors outside of devices:

Provided the intended operating voltage is within the voltage limits of the Low Voltage Directive, and the product is delivered complete with a housing featuring the usual safety features for touch protection, cable entry, etc., so that the user only needs to connect a cable or this is already attached, it is considered equipment within the meaning of the

Low Voltage Directive. It is irrelevant whether the industrial connectors are "heavy" or "light," "large" or "small," or whether they are fully assembled or a self-assembly kit. The so-called CEE circular connectors according to EN 60309 are listed by the LVD-ADCO and are listed in Annex VIII of the EU Guide as requiring CE marking. CE marking is mandatory according to the Low Voltage Directive.

After consultation with icotek GmbH, case 4 applies to the connector including cable entry system.

1.3 Copyright

2 Risk assessment

The assessment of the hazards is based on the guidelines for Risk assessment according to EN ISO 12100. The following figure shows the risk graph used to assess the input and output risks of the hazards and/or measures.

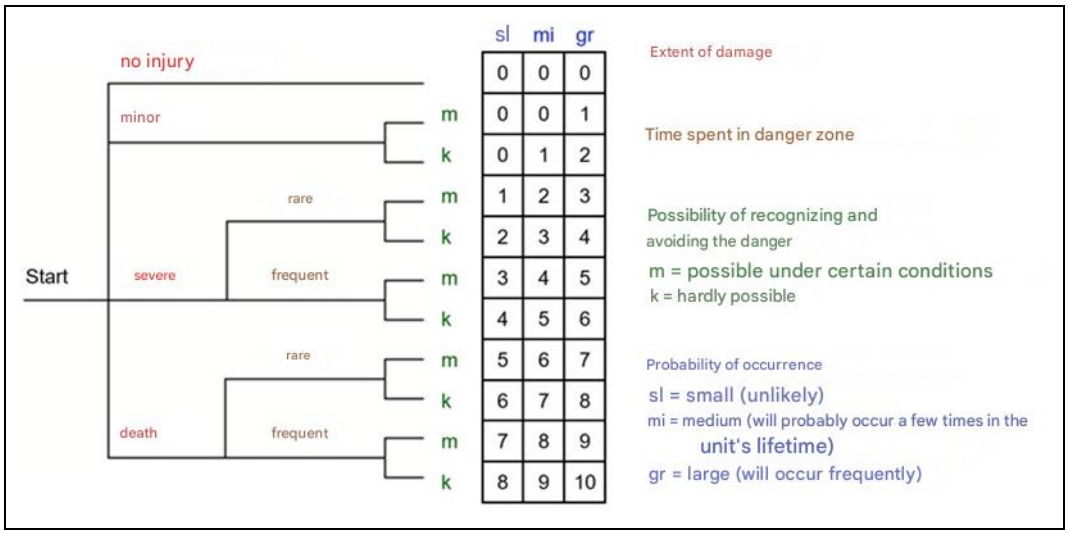

Figure 2: Risk graph

In the following risk assessment (tabular representation), the criteria of the risk graph are abbreviated as follows:

SA = Extent of damage:

K = no injury
L = minor injury
S = serious injury
T = death

AD = Length of stay in the danger zone:

S = rare
H = frequent

EA = Opportunity to detect and evade

M = possible
K = hardly possible

WE = Probability of occurrence:

K L = small
M I = medium
G R = large

The corresponding case distinctions result in an overall risk factor (RF) for risk assessment. Here, an RF of 0 represents the lowest risk and an RF of 10 represents the highest risk.

3 Measures to eliminate risks

For each identified hazard, the measures for risk mitigation are listed next to the respective hazard. Before a measure is taken, the risk of occurrence is assessed in the "Risk Assessment" column (see Form B Risk Assessment). After a measure has been taken, the residual risk is reassessed in the "Residual Risk Assessment" column. If several measures are implemented consecutively, the residual risk of the previous measure represents the risk of occurrence of the next measure. This allows you to define how the risk decreases over the course of the measures taken (see also the following figure).

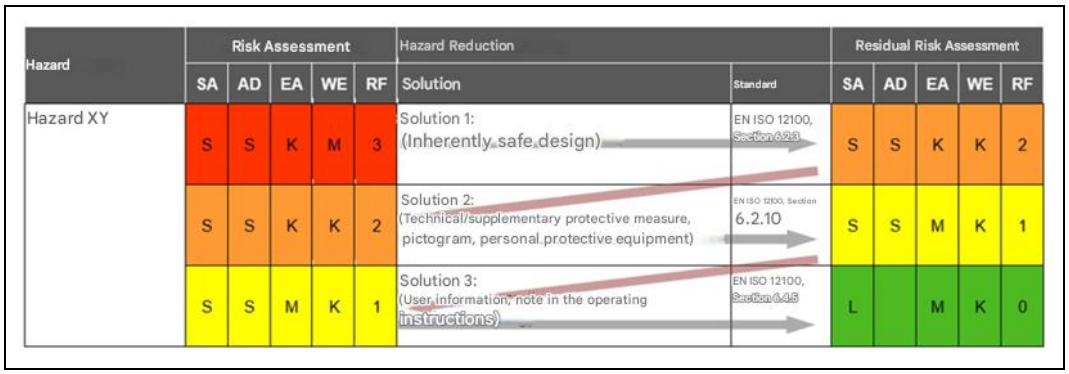

Figure 3: Measures to eliminate risks

The measures taken are differentiated according to their nature as follows:

ISK: inherently safe design

TES: technical / supplementary protective measure

PSA: Personal protective equipment

PIK: Note on Product(pictogram, …)

BA: Note in the Original operating and installation instructions

4 Determination of the safety requirements for control systems

In the measures implemented by safety-relevant components of a control system, the safety-related design of the control system is evaluated in addition to the risk assessment.

Performance Level (PL)

The required performance level is determined according to the risk graph as per the standard EN ISO 13849-1:

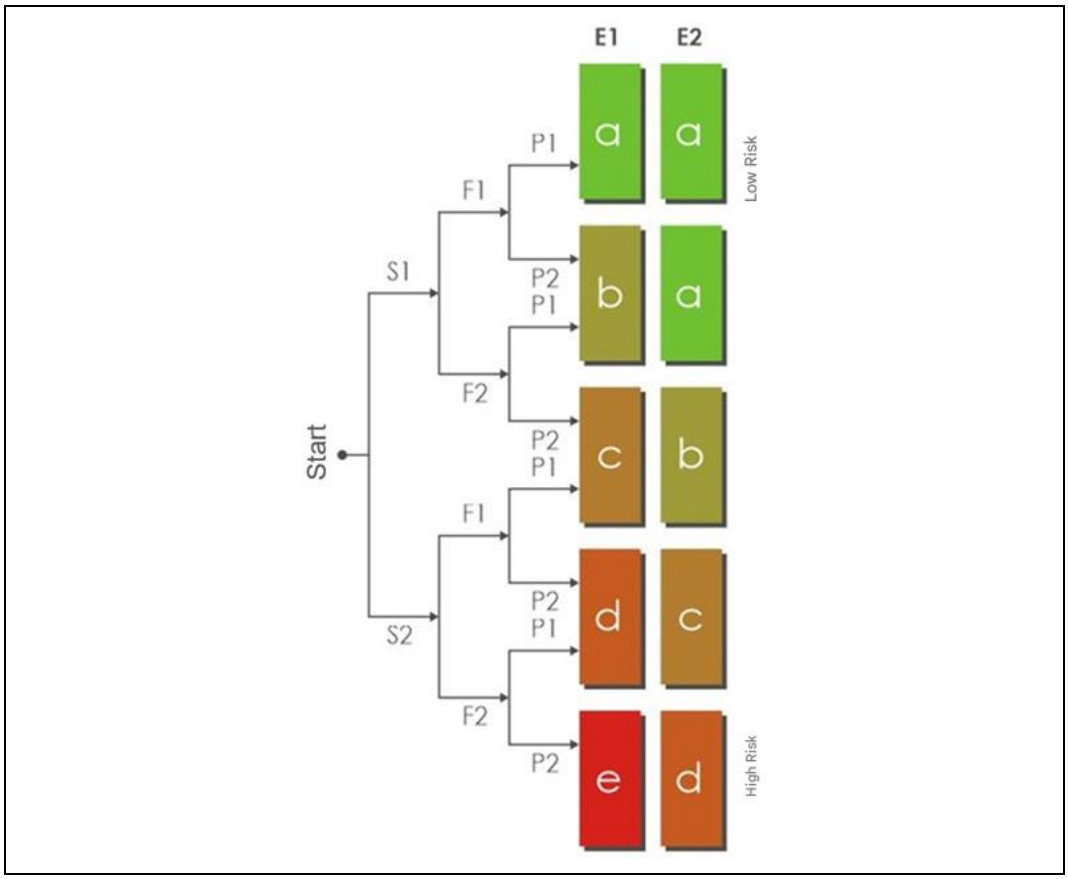

Figure 4: Risk graph EN ISO 13849-1

The following differentiation criteria are used to determine the PL:

Injury severity (S1 or S2)

S1: minor injury, curable or reversible (e.g., scratches, abrasions and cuts, bruises, flesh wounds that heal without complications), affects a person, property damage

S2: serious/fatal injury, incurable or irreversible, severed fingers or limbs, fatal accidents, amputations required, multiple people affected

Frequency and/or duration of exposure to the hazard (F1 or F2)

F1: A person is rarely to frequently exposed to the danger.

F2: A person is frequently or even constantly exposed to danger.

Options for avoidance (P1 or P2)

P1: The hazard can be identified or avoided.

P2: The hazard cannot be detected or avoided.

Probability of occurrence (E1 or E2)

E1: The probability of occurrence is high.

E2: The probability of occurrence is low.

5 Guidelines and standards research

The guidelines, regulations, technical rules and standards are the **latest and most valid versions** .

Guidelines, standards and technical rules	
– 2014/35/EU	Low Voltage Directive (must be ensured by the manufacturer)
– 2011/65/EU + (EU) 2015/863	RoHS Directive (must be ensured by the manufacturer)
– 2012/19/EU	Directive on Waste Electrical and Electronic Equipment (to be ensured by the manufacturer)
– Product Safety Act	Product Safety Act (must be ensured by the manufacturer)
– EN 61984	Connector housings and accessories for electrical and electronic devices - Mechanical strength, electrical safety, IP protection ratings, environmental conditions
– EN IEC 60664-1	Insulation distances, creepage distances, air gaps, pollution levels
– EN 60529	Protection ratings provided by enclosures (IP code)
– EN 60512-1-1	Connectors for electronic equipment - Methods of measurement and testing - Part 1-1: General investigations; Test 1a: Visual inspection (IEC 60512-1-1:2002)
– EN 60068-2-70	Environmental testing - Part 2: Tests - Test Xb: Testing the resistance of markings and inscriptions to abrasion caused by wiping with fingers and hands (IEC 60068-2-70:1995)
– EN 60512-13-5	Connectors for electronic equipment - Methods of measurement and testing - Part 13-5: Mechanical operability tests - Test 13e: Polarization and coding (IEC 60512-13-5:2006)
– EN 60352-2	Solderless connections - Part 2: Crimp connections - General requirements, test methods and application guidelines (IEC 60352-2:2006 + A1:2013)
– EN 60512-15-1	Connectors for electronic equipment - Methods of measurement and testing - Part 15-1: Mechanical tests on connectors - Test 15a: Contact retention (IEC 60512-15-1:2008)
– EN 60512-7-2	Connectors for electronic equipment - Methods of measurement and testing - Part 7-2: Impact tests (free connectors) - Test 7b: Cable-connected drop test (IEC 60512-7-2:2011)
– EN 60512-9-1	Connectors for electronic equipment - Methods of measurement and testing - Part 9-1: Endurance tests - Test 9a: Mechanical lifetime (IEC 60512-9-1:2010)

Guidelines, standards and technical rules	
– EN 60512-2-2	Connectors for electronic equipment - Methods of measurement and testing - Part 2-2: Tests of electrical continuity and resistance - Test 2b: Resistance - With specified current (IEC 60512-2-2:2003)
– EN 60512-5-1	Connectors for electronic equipment - Methods of measurement and testing - Part 5-1: Current carrying capacity tests; Test 5a: Temperature rise (IEC 60512-5-1:2002)
– EN 60512-3-1	Connectors for electronic equipment - Methods of measurement and testing - Part 3-1: Insulation tests; Test 3a: Insulation resistance (IEC 60512-3-1:2002)
– EN 60512-11-10	Connectors for electronic equipment - Methods of measurement and testing - Part 11-10: Climatic tests; Test 11j: Refrigeration (IEC 60512-11-10:2002)
– EN 60512-11-9	Connectors for electronic equipment - Methods of measurement and testing - Part 11-9: Climatic tests; Test 11i: Dry heat (IEC 60512-11-9:2002)
– EN 60068-2-1	Environmental influences - Part 2-1: Test method - Test A: Cold (IEC 60068-2-1:2007)
– EN 60068-2-2	Environmental influences - Part 2-2: Test method - Test B: Dry heat (IEC 60068-2-2:2007)
– EN 60512-11-12	Connectors for electronic equipment - Methods of measurement and testing - Part 11-12: Climatic tests; Test 11m: Damp heat, cyclic (IEC 60512-11-12:2002)
– EN 60512-11-4	Connectors for electronic equipment - Methods of measurement and testing - Part 11-4: Climatic tests; Test 11d: Rapid temperature change (two-chamber method) (IEC 60512-11-4:2002)
– EN 60068-2-14	Environmental influences - Part 2-14: Test methods - Test N: Temperature cycling (IEC 60068-2-14:2009)
– EN ISO 7010	Graphical symbols - Safety colours and safety signs - Registered safety signs
– EN ISO 12100	Machine safety - General design principles - Risk assessment and risk reduction
– EN ISO 13732-1	Ergonomics of the thermal environment - Assessment methods for human reactions upon contact with surfaces - Part 1: Hot surfaces
– EN IEC / IEEE 82079-1	Creating user manuals - structure, content and presentation
– EN IEC 61439-1	Low-voltage switchgear and controlgear assemblies - Part 1: General requirements (IEC 61439-1:2020)
– EN IEC 63000	Technical documentation for the assessment of electrical and electronic equipment with regard to the restriction of hazardous substances (IEC 63000:2016)
– EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

6 Hazard list according to EN ISO 12100

Examples of hazards				
No.	**Type or group**	**Origin:** A source of hazard can have several possible consequences.	**Possible consequences:** Some possible consequences may relate to multiple sources of danger.	**subsection in EN ISO 12100**
1	Mechanical hazards	– Acceleration / deceleration – pointed parts – Approach of a moving part to a stationary part – cutting parts – elastic elements – falling objects – Gravity – Height above ground – High pressure – lack of stability/safety – kinetic energy – Machine mobility – moving parts – rotating parts – rough, slippery surface – sharp edges – stored energy – Negative pressure / vacuum	– run over – be thrown away – Squeeze – cutting or snipping – Retract or catch – Capture – Rubbing or abrasion – Impact – Intrusion of press-sensitive media – Scissors – Slipping, tripping, and falling – Puncture or puncture – Suffocation	6.2.2.1 6.2.2.26.2.3 a)6.2.3 b)6.2.66.2.106.3.16.3.26.3.36.3.5.26.3.5.46.3.5.56.3.5.66.4.1 6.4.36.4.46.4.5

Examples of hazards				
No.	**Type or group**	**Origin:** A source of hazard can have several possible consequences.	**Possible consequences:** Some possible consequences may relate to multiple sources of danger.	**subsection in EN ISO 12100**
2	Electrical hazards	– arc – electromagnetic processes – electrostatic processes – Live parts – insufficient distance to high-voltage parts – Overload – Parts that became live when faulty – Short circuit – Heat radiation	– combustion – chemical reactions – Effects on medical implants – fatal electric shock – Falling, being thrown away – Fire – Ejection of molten parts – (electric) shock	6.2.9 6.3.26.3.3.26.3.5.46. 4.46.4.5
3	Thermal Hazards	– explosion – flame – Objects or materials of high or low temperature – Radiation from heat sources	– combustion – Dehydration – Discomfort – Frostbite – Injuries caused by radiation from heat sources – Scalding	6.2.4 b) 6.2.8 c)6.3.2.76.3.3.2.16.3 .4.5
4	Hazards from noise	– Cavitation processes – Exhaust system – gas escaping at high speed – Manufacturing process (punching, cutting, etc.) – moving parts – rubbing surfaces – Rotating parts with imbalance – whistling pneumatic devices – worn parts	– Discomfort – Loss of consciousness – Balance disorder – permanent hearing loss – stress – Tinnitus (ringing in the ears) – fatigue – all other (e.g. mechanical, electrical) problems resulting from a disruption of speech communication or a disruption of acoustic signals	6.2.2.2 6.2.3 c) 6.2.4 c) 6.2.8 c) 6.3.1 6.3.2.1 b) 6.3.2.5.1 6.3.4.2 6.4.3 6.4.5.1 b) and c)

Examples of hazards				
No.	**Type or group**	**Origin:** A source of hazard can have several possible consequences.	**Possible consequences:** Some possible consequences may relate to multiple sources of danger.	**subsection in EN ISO 12100**
5	Hazards from vibration	– Cavitation processes – Misalignment of moving parts – movable equipment – rubbing surfaces – Rotating parts with imbalance – swinging equipment – worn parts	– Discomfort – Disorders of the lower spine – neurological disease – Bone joint damage – spinal injury – Vascular disease	6.2.2.2 6.2.3 c)6.2.8 c)6.3.3.2.16.3.4.36.4.5.1 c)
6	Hazards from radiation	– ionizing radiation source – low-frequency electromagnetic radiation – optical radiation (infrared, visible and ultraviolet), including laser beams – high-frequency electromagnetic radiation	– combustion – Eye and skin damage – Effects on reproductive capacity – mutation – Headaches, insomnia, etc.	6.2.2.2 6.2.3 c)6.3.3.2.16.3.4.56.4.5.1 c)
7	Hazards from materials and substances	– Aerosol – biological and microbiological (viral or bacterial) substance – fuel – Dust – Explosive – Fibers – flammable material – liquid – fumes – gas – Fog – oxidizing agent	– Breathing difficulties, suffocation – Cancer – corrosion – Effects on reproductive capacity – explosion – Fire – infection – Changes in the genetic material – poisoning – Awareness	6.2.2.2 6.2.3 b)6.2.3 c)6.2.4 a)6.2.4 b)6.3.16.3.3.2.16.3.4.46.4.5.1 c)6.4.5.1 g)

Examples of hazards				
No.	**Type or group**	**Origin:** A source of hazard can have several possible consequences.	**Possible consequences:** Some possible consequences may relate to multiple sources of danger.	**subsection in EN ISO 12100**
8	Ergonomic hazards	– Access – Design or arrangement of advertisements and optical displays – Design, arrangement or detection of control devices – effort – Flickering, glare, shadowing and stroboscopic effects – local lighting – psychological overload/understimulation – posture – repetitive tasks – visibility	– Discomfort – fatigue – Musculoskeletal disorders – stress – all other (e.g., mechanical, electrical) problems as a result of human error	6.2.2.1 6.2.76.2.86.2.11.86. 3.2.16.3.3.2.1
9	Hazards associated with the machine's operating environment	– Dust and fog – electromagnetic interference – Lightning strike – moisture – Contaminants – Snow – temperature – Water – wind – Oxygen deficiency	– combustion – minor illnesses – Slipping, falling – Suffocation – all other problems that arise as a result of the effects of the hazard sources on the machine or on parts of the machine	6.2.6 6.2.11.116.3.2.16.4. 5.1 b)
10	Combinations of hazards	– e.g. repetitive activity + exertion + high ambient temperature	– e.g. dehydration, loss of consciousness, heat shock	—

7 Risk assessment according to EN ISO 12100

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
1	**Limits of the connector including cable entry system, intended use**		
1.1	**Intended Use**	The operational reliability of the connector including cable entry system This is only guaranteed if they are used as intended. The cable entry system with connector enables electrical conductors to be connected securely. Connectors must not be plugged in or disconnected while live. When unplugged, the connector must be de-energized. The cable gland with plug and housing is a component that allows electrical conductors to be connected and is intended to make connections and/or disconnect connections with a suitable counterpart. Connectors are devices that, when used as intended (under electrical voltage), must not be plugged in or unplugged (unlike plug-in devices). The connector must not be live when unplugged. This also applies when closed with a protective cap. Protection against electric shock must be ensured by the connector's installation method. This must be achieved through measures taken by the user during installation. Unless otherwise specified, the socket insert mounted in the connector housing provides the standard-specified touch protection for the mating side, even when unmated. Adjacent connectors of the same or different designs must be secured against incorrect mating by keying.	Original operating and installation instructions

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
		The connector including cable entry system may only be installed and put into operation by qualified electricians who are familiar with the safety regulations, have been trained and instructed. The connector including cable entry system may only be used within the scope of its technical specifications. Proper use includes adhering to the specifications, the Original operating and installation instructions , the maintenance and repair regulations, and all applicable national safety, occupational health and safety, and accident prevention regulations. Any use beyond these specifications is considered improper. The specified maximum technological data must not be exceeded. The application range of the connector including cable entry system is the industrial sector. For uses other than those listed here, the connector including cable entry system not specified and is considered improper use. In particular, it is prohibited to – to use defective or unsuitable accessories, – the connector including cable entry system if the protective housing is tampered with or defective, – The connector including cable entry system should not be used in potentially explosive atmospheres, such as those containing flammable liquids, gases, or dust . The fully assembled equipment can generate sparks that could ignite the dust or vapors. – the connector including cable entry system if it is not ready for operation or has been modified, – any objects on the connector including cable entry system. Remove all objects located on the connector including cable entry system. – onto the connector including cable entry system or to use it as a climbing aid,	

Risk assessment according to EN ISO 12100			
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Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
		– to remove the housing of the connector including cable entry system – to connect or disconnect the plug of the connector including cable entry system – the connector including cable entry system to rain or wet conditions. Water entering the connector including cable entry system, increases the risk of electric shock. Proper use also includes – Adherence to all instructions from the Original operating and installation instructions and the external documentation, – compliance with inspection and maintenance intervals, – the use of operating and auxiliary materials in accordance with applicable safety regulations, – Compliance with state, regional and local safety and accident prevention regulations, – compliance with operating conditions, – Compliance with the technical specifications stated in the technical data. Use the connector including cable entry system Only use as intended; otherwise, safe operation cannot be guaranteed. For all personal injury and property damage resulting from improper use, the operator of the connector including cable entry system responsible!	
1.2	**Further improper use of the connector including cable entry system**	-	-
1.3	**Use in explosion protection areas**	-	-
1.4	**Program changes to the connector including cable entry system**	-	-

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
1.5	**Installation of the connector including cable entry system**	Installation must only be carried out by qualified electricians who are familiar with the applicable national, regional and local safety and accident prevention regulations. The connector including cable entry system may only be put into operation once it has been determined that all electrical safety requirements have been met. It is the user's responsibility to carry out an appropriate and complete risk assessment, evaluation and testing of the connector including cable entry system with regard to the specific application or use.	Original operating and installation instructions
1.6	**Reasonably foreseeable misuse**	Misuse can occur due to loss of control, reflexes, lack of concentration, distraction, laziness, pressure, certain individuals (e.g., adolescents, pregnant or breastfeeding mothers, employees without sufficient German language skills, people with disabilities, temporary workers, interns, career starters), circumvention of protective measures (human factor). Other usage limits are: – Intervention options. – Intended use and reasonably foreseeable misuse. – Required level of education. – Use of individuals of different genders, ages, or limitations (where foreseeable). Specific examples of misuse include: – Use the connector including cable entry system only as intended. – use the connector including cable entry system if maintenance or inspection is lacking. – use the connector including cable entry system if it has been ensured that it is securely fastened and professionally connected.	Original operating and installation instructions

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
1.7	**Further reasonably foreseeable misuse**	-	-
1.8	**Spatial boundaries**	For dimensions, weights and other technical specifications, please refer to Original operating and installation instructions .	Original operating and installation instructions
		Movement space, danger zone, space requirements of persons, interaction / interface "human - connector including cable entry system" and " connector including cable entry system - Energy supply". – The connector including cable entry system must be freely accessible. The working space must comply with ergonomic guidelines and standards. – Space requirements for personnel during operation and maintenance: at least 100 mm on all sides.	Original operating and installation instructions
1.9	**Time limits**	The intended service life of the connector including cable entry system is currently unknown. described in the Original operating and installation instructions	Original operating and installation instructions
1.10	**Further borders**	Materials to be processed, level of cleanliness, ambient temperature, humidity, sun, dust, indoor/outdoor. The following requirements must be met at the deployment location: – Please note that the installation site must have sufficient load-bearing capacity and be level. – Use the connector including cable entry systemin well-ventilated rooms. – mount the connector including cable entry system on heat-sensitive surfaces or near heaters, air conditioners or flammable materials. – install the connector including cable entry system near impermissible electromagnetic fields. – install the connector including cable entry systemin locations where a corrosive or explosive atmosphere is present.	Original operating and installation instructions

Risk assessment according to EN ISO 12100			
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Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
		– use the connector including cable entry systemin EX areas. – Pay attention to the environmental conditions. – Please note that the connector including cable entry system must be protected from accidental impacts. Do not use vehicles (manual or electric pallet trucks, forklifts) in the vicinity of the connector including cable entry system. – Please note that the connector including cable entry system is intended for use in an industrial environment that is clean and dry. – Allow at least 100 mm on all sides for repairs. – Please note that only persons familiar with and trained in the safety regulations are permitted to work on or with the connector including cable entry system. – Please note that attention must be paid to order and cleanliness, including: – All lines and cables should be properly laid and covered if necessary. – Tools in the vicinity of the connector including cable entry system should be put away. – Peripherals (if any) are positioned in such a way that they do not restrict operation or use, – Any loose parts and waste (if any) should be removed regularly.	
1.11	**Energy sources**	The connector including cable entry system has the following power sources: – Electricity (in application)	Original operating and installation instructions
1.12	**Experience in deployment**	At the time the information was gathered, no known accidents involving the connector including cable entry system known.	The absence of an accident history, a small number of accidents, or a low level of damage from accidents does not lead to the assumption that the risk is low.

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

Form A: Information, life stages			Remarks, reference to further documents
2	**environment of use**		
	private		
	commercial	X	
3	**User groups**		
		Life phase / Operating mode	**qualification**
	Qualified specialists, trained personnel	Transport	Trained specialists
		Assembly Disturbance Maintenance / Cleaning	People with the necessary technical training
		Normal operation	Trained personnel
		Exams	Competent person
	Qualified specialists	The commissioning and decommissioning of the connector including cable entry system Use is prohibited until it is ensured that the user is informed about the intended use, safety and accident prevention regulations.	People with the necessary technical training
4	**Materials**		
4.1	**Hazardous auxiliary and operating materials**	-	-
4.2	**Dangerous components in the connector including cable entry system materials used**	-	-
4.3	**Dangerous from the connector including cable entry system processed materials**	-	-

Risk assessment according to EN ISO 12100			
Product name:	connector including cable entry system	Created by:	Nikolaj SchatalowTechnical Documentation CE
Productnumber:	see nameplate	Status:	21.11.2023

	Form A: Information, life stages		Remarks, reference to further documents
	Life phases		
5	**T**	Transport	The connector including cable entry system will be delivered to the customer by a transport company authorized by icotek GmbH.
	M	Assembly	operator
	I	Commissioning	operator
	N	Normal operation	operator
	S	Disturbance	operator
	W	Maintenance, cleaning	operator
	A	Decommissioning	operator
	D	Disassembly	operator
	E	Disposal	operator

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
1 Mechanical hazards															
1.1	Hazards may arise at the connector including cable entry system Markings appear.	**all phases of life**	S	S	M	GR	3	ISK: The connectors comply with standard EN 61984 6.2. The markings should be clear and distinguishable. This can be achieved by Printing, casting, pressing, carving or when similar methods are used Tests according to EN 60068-2-70 EN 61984 7.3.2 carried out.	EN ISO 12100 EN 61984 EN 60068-2-70	S	S	M	KL	1	
1.2	Hazards can arise at the connector including cable entry systempolarity and coding.	**all phases of life**	S	H	K	KL	4	ISK: Compliant with EN 61984 6.3 and 6.9.1. Multi-stage connection of the connectors must prevent incorrect connection. No functional damage occurs. Tests performed according to EN 60512-13-5. Unencapsulated plug (internal connection) 20 N. Closed connector (external connection) with 1.5 times the insertion force, but not more than 80 N.	EN ISO 12100 EN 61984 EN 60512-13-5	S	S	M	KL	1	
1.3	at the connector including cable entry systemdue to poor holding force of the clamp.	**all phases of life**	S	S	M	GR	3	ISK: The connectors comply with standard EN 61984 6.6.	EN ISO 12100 EN 61984	S	S	M	KL	1	
1.4	Hazards can arise at the connector including cable entry systemscrew wiring.	**all phases of life**	S	H	K	KL	4	ISK: Complies with EN 60352-2 Table 1 Constant voltage, the conductor can do not release from the pressure. A visual inspection of the crimp area must be carried out in accordance with EN 60352-2.	EN ISO 12100 EN 60352-2	S	S	M	KL	1	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
1.5	Hazards can arise at the connector including cable entry system	all phases of life	S	S	M	GR	3	ISK: Compliant with EN 61984 6.18.2 Fixed, no axial direction, which caused abnormal operation. A movable single contact holds the Maximum force upright less than 50 N. Tests according to IEC 60512-15-1 Test 15a Axial load, test speed: 20 mm/min, permissible bit: 1.0 mm displacement.	EN ISO 12100 EN 61984	S	S	M	KL	1	
1.6	arise at the connector including cable entry systemdue to a lack of mechanical strength .	all phases of life	S	H	K	KL	4	ISK: Complies with standard EN 61984 6.18.1 and 6.18.3 Regulations. Tests performed according to EN 60512-7-2 7b.	EN ISO 12100 EN 61984 EN 60512-7-2	S	S	M	KL	1	
1.7	at the connector including cable entry systemdue to insufficient mechanical strength (durability test). arise.	all phases of life	S	H	K	KL	4	ISK: Complies with standard EN 61984 6.14.1. Tests according to EN 60512-9-1 9a and EN 61984 7.3.9 carried out.	EN ISO 12100 EN 61984 EN 60512-9-1	S	S	M	KL	1	
1.8	Arrangement of components: Injuries such as hand injuries resulting from the overly close arrangement of required components. 	all phases of life	S	S	M	KL	1	PSA: Workwear, safety shoes.	EN ISO 12100 EN 61984	L		M	KL	0	
			L		M	KL	0	BA: the risk of mechanical injuries in the area of use of the connector including cable entry system. The symbols on the packages must be observed. Open the packages only immediately before assembly begins. Define and use PPE.	EN ISO 12100 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
1.9	During assembly, there is a risk of injury from sharp edges or hand injuries. 	**M**	S	H	K	MI	5	PSA: Protective gloves.	EN ISO 12100 EN 61984	S	H	K	KL	4	
			S	H	K	KL	4	PIK: Warning: Risk of cuts, warning of hand injuries.	EN ISO 12100 EN 61984	S	S	M	KL	1	
			S	S	M	KL	1	BA: Explain the pictograms. out the risk of cuts and hand injuries in the area of use of the connector including cable entry system. Wear protective gloves during assembly.	EN ISO 12100 EN 61984	K			KL	0	
1.10	Arrangement of components: Injuries such as hand injuries resulting from the overly close arrangement of required components.	**M**	S	H	M	GR	5	BA: The application area of the connector including cable entry systemmust be chosen in such a way that the required movement space of the personnel in the application area is not restricted or hindered. Define the requirements for the area of application and identify the necessary freedoms. Further measures: – Isolate the danger zone. – Keep unauthorized persons away. – Designate a responsible person.	EN ISO 12100 EN 61984	L		M	GR	1	
1.11	Injuries such as hand injuries resulting from assembly work on the connector including cable entry system.	**I**	S	H	M	GR	5	BA: – Isolate the danger zone. – Keep unauthorized persons away. – Designate a responsible person.	EN ISO 12100 EN 61984	L		M	GR	1	
1.12	There is a risk of tripping or falling due to improperly laid power supply lines.	**all phases of life**	S	H	M	MI	4	ISK: Cables installed by the manufacturer are laid in a tripping-free and barrier-free manner.	EN ISO 12100 EN 61984	S	S	M	MI	2	
			S	S	M	MI	2	BA: Lay power supply lines in a way that prevents tripping hazards and barriers (e.g. under covers). Mark tripping hazards with color.	EN ISO 12100 EN 61984	L		M	MI	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
1.13	Dismantling the entire structure: There is a risk of injury, such as hand injuries or crushing, when disassembling the connector including cable entry system. 	**D, E**	S	S	M	MI	2	PSA: Workwear, protective gloves, safety shoes.	EN ISO 12100 EN 61984	S	S	M	KL	1	
			S	S	M	KL	1	BA: The work may only be carried out by authorized and trained personnel. Define and use PPE. Disconnect power lines and dispose of components, auxiliary materials, and operating supplies in accordance with the applicable legal regulations.	EN ISO 12100 EN 61984	L		M	KL	0	
1.14	There is a risk of serious injury due to instability of the individual components during the assembly of the connector including cable entry systemas a result of incorrect assembly.	**M, I**	S	H	M	GR	5	ISK: The connector including cable entry systemmust be placed and fastened on an operating area dimensioned for the conditions, weights and loads that will occur.	EN ISO 12100 EN 61984	L		M	GR	1	
			L		M	GR	1	BA: The installation of the connector including cable entry systemmay only be carried out by authorized and trained specialists. During assembly, observe the tightening torques of all screw connections. Check for correct assembly before commissioning (completeness, dimensions, tightening torques).	EN ISO 12100 EN 61984	K			GR	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
1.15	There is a risk of bruising. 	**M, I, N, W**	S	H	M	GR	5	PSA: Workwear, protective gloves.	EN ISO 12100 EN 61984	S	S	M	GR	3	
			S	S	M	GR	3	BA: Work is carried out by trained and authorized personnel. Unauthorized entry prohibited. Use and define PPE.	EN ISO 12100 EN 61984	S	S	M	KL	1	
1.16	There is a risk of cuts. 	**M, I, N, W**	S	H	M	GR	5	PSA: Workwear, protective gloves.	EN ISO 12100 EN 61984	S	S	M	GR	3	
			S	S	M	GR	3	BA: Work is carried out by trained and authorized personnel. Unauthorized entry prohibited. Use and define PPE.	EN ISO 12100 EN 61984	S	S	M	KL	1	
1.17	Maintenance involves various hazards.	**W**	S	H	M	GR	5	ISK: Implement a supplementary protective measure through an effective shutdown concept: – LockOut / TagOut “LoTo” guarantees protection against all dangerous energy sources (e.g., electrical). – Required for service and maintenance work where adequate protection of personnel from dangerous energy sources is not feasible during the work and protective measures must be rendered ineffective. Lockout/Tagout measures are not required: – during routine tasks or frequently occurring operational situations.	EN ISO 12100 EN 61984	S	S	M	GR	3	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
			S	S	M	GR	3	BA: Work may only be carried out by personnel who meet the qualification requirements for maintenance staff.	EN ISO 12100 EN 61984	S	S	M	KL	1	
1.18	Risk due to improper storage: Injuries resulting from corroded or unusable components due to incorrect storage conditions.	**W**	L		K	MI	1	BA: Observe storage conditions for packages. Insert storage conditions. The storage area should be cool, dry, dust-free, protected from light, and moderately ventilated. Outdoor storage protected from the weather is not permitted. Solvents, fuels, lubricants, chemicals, acids, disinfectants, and similar substances must not be stored in the storage area.	EN ISO 12100 EN 61984	L		M	MI	0	
1.19	Entering the operational area poses a risk of tripping.	**all phases of life**	S	S	K	MI	3	BA: The risk of tripping or slipping can be minimized by maintaining order and cleanliness in the work area and the surrounding area. order and cleanliness in the operational area . Lay cables in a way that prevents tripping hazards.	EN ISO 12100 EN 61984	L		K	MI	1	
1.20	The connector including cable entry systempresents various hazards due to lack of maintenance.	**all phases of life**	S	H	K	MI	5	BA: Regular inspection of the connector including cable entry system: Work may only be carried out by personnel who meet the qualification requirements for maintenance personnel (competent person). Regularly check the casings for damage. The results of the tests must be documented in a test log or test report and must be kept at least until the next test. An inspection sticker may only be affixed if the inspection is successfully completed. There must be no serious safety deficiencies.	EN ISO 12100 EN 61984	L		K	MI	1	
1.20	There are risks associated with improper transport.	**T**	S	H	K	MI	5	BA: – The connector should be carefully and securely packaged to prevent damage during transport. Ensure that the packaging meets the	EN ISO 12100 EN 61984	L		K	MI	1	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
								specific requirements for transporting electronic components. – During transport, avoid impacts and shocks to the connector. Store the packaging in a way that protects it from physical damage. – The packaging should be clearly marked to alert transport personnel that it contains sensitive electronic components. Particular emphasis should be placed on the fragility of the included connector parts. – Do not expose the connector to extreme temperatures during transport. Protect it from direct sunlight, heat sources, or frost to prevent possible damage.							

No.	Form B Hazard	Life phase(s)	Risk assessment SA	AD	EA	WE	RF	Risk reduction Solution	standard	Residual risk assessment SA	AD	EA	WE	RF	Test criterion, comment
2 Electrical hazards															
2.1	at the connector including cable entry systemcontact impedance measurement. The contact impedance measures how easily or with what difficulty electric current can flow through an electrical contact .	**all phases of life**	T	S	K	MI	7	ISK: Tests performed according to EN 60512-2-2 2b.	EN ISO 12100 EN 60512-2-2	S	S	M	KL	1	
2.2	Hazards can arise at the connector including cable entry system	**all phases of life**	T	S	K	MI	7	ISK: Complies with EN 61984 6.16 Temperature rise the connector at ambient temperature. Tests were carried out according to EN 61984 7.3.8 Table 7 and EN 60512-5-1 5a.	EN ISO 12100 EN 61984 EN 60512-5-1	S	S	M	KL	1	
2.3	Hazards can arise at the connector including cable entry system	**all phases of life**	T	S	K	MI	7	ISK: Compliant with EN 61984 6.13. No arcing or flashovers occur. Tests were carried out in accordance with EN 61984 7.3.12 and EN 61984 Table 8.	EN ISO 12100 EN 61984						
2.4	at the connector including cable entry systemdue to the lack of insulation impedance measurement. The insulation impedance indicates how well an electrical insulating material prevents the passage of electric current.	**all phases of life**	T	S	K	MI	7	ISK: No less than 1010 Ω. Tests were performed according to EN 60512-3-1 Test 3a Method B.	EN ISO 12100 EN 60512-3-1	S	S	M	KL	1	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.5	Touching live parts can cause burns at the points where current enters and exits the circuit.	all phases of life	S	S	K	GR	4	BA: All work on the electrical system may only be carried out by qualified electricians. Qualified electricians are specifically trained for working on electrical systems, are aware of the dangers of electrical voltage, and can independently avoid potential hazards through correct procedures. Define the qualification requirements for the personnel performing the work. Five safety rules: 1.Unlock. 2.Secure against accidental reactivation. 3.Determine the absence of tension. 4.Ground and short-circuit. 5.Cover or barricade adjacent live parts.	EN ISO 12100 EN 60204-1 EN 61984	L		K	KL	0	
2.6	Contact with dangerous direct current voltages above 120 V can lead to chemical processes in the body, which pose a risk of poisoning through electrolysis.	all phases of life	T	S	K	GR	8	ISK: Care must be taken to use insulated cables and plugs. Protective measures against accidental contact must be in place.	EN ISO 12100 EN 60204-1 EN 61984	K			GR	0	
			K			GR	0	BA: All work on the electrical system may only be carried out by qualified electricians. Qualified electricians are specifically trained for working on electrical systems, are aware of the dangers of electrical voltage, and can independently avoid potential hazards through correct procedures. Define qualification requirements for the personnel carrying out the work. Five safety rules: 1.Unlock. 2.Secure against accidental reactivation. 3.Determine the absence of tension. 4.Ground and short-circuit. 5.Cover or barricade adjacent live parts.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.7	An electric shock from touching live parts can lead to death. Other dangerous situations can arise from, among other things, the following causes: – Electrical equipment malfunctions - electric shock or fire. – Faults in control circuits - Productmalfunction . – Disruptions / interruptions in power supply - Productmalfunction . – Loss of continuous connection of electrical circuits - failure of a safety function. – Electromagnetic and electrostatic interference - Productmalfunction . – Release of stored energy - electric shock or unexpected movements. – Loud noise - hearing damage. – High surface temperatures - burns.	I	T	H	K	MI	9	ISK: The following measures must be taken into account at the connector including cable entry systemby icotek GmbH: Protection against direct and indirect contact. Electrical components must: – Be suitable for their intended use. – They comply with the applicable EN or IEC standards. – Use according to the manufacturer's instructions. – They should be laid separately from pneumatic, hydraulic and other components.	EN ISO 12100 EN 60204-1 EN 61984	T	S	K	MI	7	
			T	S	K	MI	7	BA: Before switching on, check the electrical connection of the connector including cable entry systemfor correct installation and secure fit. Record the result in the test report. Note the procedure in the sequence of actions for commissioning. Reference to test report.	EN ISO 12100 EN 60204-1 EN 61984	S	S	M	KL	1	
2.8	An electric shock from touching live parts can lead to death. Physical damage to the human body caused by electric current: – Group 1: < 1 mA - barely perceptible. – Group 2: < 16 mA - maximum current at which an average person can grasp and release. – Group 3: 20 mA - 100 mA - Paralysis of the respiratory muscles, threshold to ventricular fibrillation. – Group 4: > 2 A - Cardiac arrest and internal organ damage.	all phases of life	T	H	K	MI	9	ISK: The electrically powered connector including cable entry systemmust be designed, built, and equipped in such a way as to avoid or be able to avoid all hazards arising from electricity. Cables, wires, conduits, and equipment are selected to be suitable for the prevailing operating conditions and external influences (IP rating). For the IP protection class in public areas, the first digit must be at least 4. For an electrical enclosures the first digit must be at least 2. Protection through automatic shutdown in case of fault. All equipment is designed to be touch-proof. For leakage currents exceeding 10 mA, additional measures must be taken (grounding). The grounding concept must be reviewed by icotek GmbH	EN ISO 12100 EN 60204-1 EN 61984 EN IEC 60664-1 EN 60529	T	S	K	MI	7	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
								The equipment must be protected against the following influences: – Overcurrent, as a result of a short circuit. – Overload or loss of cooling of relevant assemblies. – Earth fault / fault current. – Overvoltage caused by lightning strikes and switching operations. – Abnormal temperature. – Failure or drop in supply voltage. **The manufacturer must carry out an electrical safety test in accordance with the Low Voltage Directive and EN 61984, EN IEC 60664-1 and EN 60529.** **The requirements must be observed, documented, and implemented. Please refer to the notes in the summary.**							
			T	S	K	MI	7	PIK: Enclosures that do not otherwise clearly indicate they contain electrical equipment that could pose a risk of electric shock must be marked with the appropriate graphic symbol. The warning label must be affixed to the electrical enclosures or its covers in a clearly visible location. A warning sign must be affixed if leakage currents exceed 10 mA.	EN ISO 12100 EN 60204-1 EN ISO 7010 EN 61984	T	S	M	MI	6	pictogram(s) attached to the connector including cable entry system?
			T	S	M	MI	6	BA: All work on the electrical system may only be carried out by qualified electricians. Qualified electricians are specifically trained for working on electrical systems, are aware of the dangers of electrical voltage, and can independently avoid potential hazards through correct procedures. Define qualification requirements for the personnel carrying out the work. electrical enclosures must always be kept closed during operation.	EN ISO 12100 EN 60204-1 EN 61984	S	S	M	KL	1	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
								Damage to housings and cables can compromise the protection against direct contact with live parts. In this case, repairs must be carried out immediately before the next power-up. Five safety rules: 1.Unlock. 2.Secure against accidental reactivation. 3.Determine the absence of tension. 4.Ground and short-circuit. 5. Cover or barricade adjacent live parts. Further safety instructions: – Before installing or servicing the connector, it must be ensured that the electrical voltage is switched off and the system is de-energized. – Ensure that the contact protection specified by the standard, especially on the plug-in side, is also guaranteed when the connector is unplugged. – Coded connectors must be correctly aligned and connected to prevent incorrect mating. Ensure that adjacent connectors are properly coded. – The cable entry point and cable gland are crucial for ensuring reliable strain relief of the connected cables. Make sure they are properly installed to prevent strain. – Perform regular inspections to ensure the connector and its components are in perfect working order. If any signs of wear, damage, or malfunction are observed, the connector should be taken out of service immediately. – The connector must not be plugged in or unplugged while under voltage, whether plugged in or unplugged. – The installation and use of the connector must comply with applicable national and international electrotechnical standards.							

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.9	All electrical equipment is at risk of fire due to overload and insulation faults.	all phases of life	T	H	M	KL	7	ISK: All equipment must be dimensioned according to its load, secured, undamaged, installed according to the rules of technology, and checked for safety at regular intervals. Protection through automatic shutdown in case of overload (e.g. short circuit) must be provided.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.10	All electrical equipment carries the risk of electric shock if used incorrectly.	all phases of life	T	H	M	KL	7	ISK: Requirements for electrical enclosures : – Accessibility and maintenance. – Protection against external influences or conditions under which they are intended to be operated. – Operation and maintenance of the Productits associated equipment must be possible from the front. – Where a special tool is required to electrical enclosures Requirements for wiring techniques: – Secured against self-loosening. – Two or more conductors on one terminal are only permitted if the terminal is appropriately designed. – Only one protective conductor per terminal connection point. – Soldered connections are only permitted if the connections are suitable for soldering. – Terminals / terminal strips must be clearly marked or labelled and must correspond to the plans. – Lay the pipes in such a way that liquids run away from the screw connections. – Wire ends with ferrules or similar (no solder). – Marking: legible, durable and suitable for the physical environmental conditions. – Each conductor must be identifiable at each connection in accordance with the technical documentation. – Recommendation: Mark conductors identifiably using numbers, alphanumeric codes, color (either solid or with one or more stripes), or a combination thereof. Numbers should be Arabic, letters Latin. – Color coding - Note: for 3-phase connections: L1 Brown, L2 Black. Terminals should be provided for the following requirements: – Protective conductor.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
								– Potential equalization conductor. – Control lines exiting the cabinet/housing. – Wiring that needs to be disconnected, for example, for shipping. Clamps must be: – be divided into groups (main circuits, control circuits, other control circuits from external sources), – must be clearly marked or labelled and must correspond to the plans. – It must be installed and wired in such a way that neither the internal nor the external wiring runs over the terminals, – must be installed at least 0.2 m above the access level. – They should be mounted and wired in such a way that they can be easily connected to conductors, cables and wires, – It must be sufficiently large to accommodate the ladder.							
2.11	An electric shock carries the risk of secondary accidents, e.g., falls due to fright.	**all phases of life**	S	H	K	KL	4	BA: Five safety rules: 1.Unlock. 2.Secure against accidental reactivation. 3.Determine the absence of tension. 4.Ground and short-circuit. 5.Cover or barricade adjacent live parts.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.12	Dangers arising from non-compliance with the following general conditions of Directive 2014/35/EU. a) The essential characteristics, knowledge and observance of which are necessary for proper and safe use, must be indicated on the electrical equipment or, if this is not possible, on an accompanying document. b) The electrical equipment and its components must be designed so that they can be safely and properly connected or plugged in. c) Electrical equipment must be designed and constructed in such a way that, when used as intended and properly maintained, protection from the hazards listed in points 2 and 3 is ensured.	**all phases of life**	T	H	K	MI	9	ISK: **The manufacturer must carry out an electrical safety test in accordance with the Low Voltage Directive and EN 61984, EN IEC 60664-1 and EN 60529.** **The requirements must be observed, documented, and implemented. Please refer to the notes in the summary.**	EN ISO 12100 EN 60204-1 EN 61984 EN IEC 60664-1 EN 60529	K			KL	0	
2.13	Hazards from electrical equipment. a) Humans and domestic and farm animals are adequately protected from the dangers of injury or other damage that may be caused by direct or indirect contact. b) No temperatures, arcs, or radiation are generated that could pose a danger. c) To adequately protect people, domestic and farm animals and goods from non- electrical hazards that experience has shown to emanate from electrical equipment. d) The insulation is adequate for the intended stresses.	**all phases of life**	T	H	K	MI	9	ISK: **The manufacturer must carry out an electrical safety test in accordance with the Low Voltage Directive and EN 61984, EN IEC 60664-1 and EN 60529.** **The requirements must be observed, documented, and implemented. Please refer to the notes in the summary.**	EN ISO 12100 EN 60204-1 EN 61984 EN IEC 60664-1 EN 60529	K			KL	0	
2.14	Hazards caused by external influences on electrical equipment. a) To withstand the intended mechanical stresses to such an	**all phases of life**	T	H	K	MI	9	ISK: **The manufacturer must carry out an electrical safety test in accordance with the Low Voltage**	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
	extent that people, domestic and farm animals or goods are not endangered. b) Under the intended environmental conditions, it should withstand non-mechanical influences to such an extent that people, domestic and farm animals or goods are not endangered. c) Do not endanger people, domestic and farm animals or goods during foreseeable overloads.							**Directive and EN 61984, EN IEC 60664-1 and EN 60529.** **The requirements must be observed, documented, and implemented. Please refer to the notes in the summary.**	EN IEC 60664-1 EN 60529						
2.15	There is a risk of serious injury due to faulty insulation. The insulation must be designed in such a way that expected environmental influences do not lead to any impairment of the insulation.	**all phases of life**	T	H	K	MI	9	ISK: All electrical wiring must be designed and tested in accordance with foreseeable environmental conditions.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
2.1 6	There is a risk of serious injury due to faulty electrical technical documentation.	**all phases of life**	T	H	M	KL	7	ISK: Requirements for electrical technical documentation: – Main document (parts list or document list). – Supplementary documents including a clear, comprehensive description of the equipment, installation and assembly as well as the connection to the power supply, power supply requirements, information on the physical environment (lighting, vibration, noise level, air pollution) (if applicable), overview (block) diagram (if applicable), circuit diagrams. – Information (where applicable) on: programming, sequence of actions, frequency of inspection, frequency and method of functional testing, instructions for adjustment, maintenance and repair, in particular of protective devices and circuits, recommended spare parts list and list of supplied tools. – A description of the technical protective measures and the existing safety functions (if applicable). – A description of the means to be used if it is necessary to render the technical protective measures ineffective (e.g. for setup or maintenance). – Work instructions for safely carrying out maintenance work. – Information on handling, transport and storage. – Information regarding load current, peak current during start-up and permissible voltage dips / voltage drops. – Information about residual risks - related protective measures, special training, necessary PPE, etc.	EN ISO 12100 EN 60204-1 EN 61984	K			KL	0	
3 Thermal hazards															
3.1	The connector including cable entry systemcan pose general thermal hazards, which apply to the hazard points "burns", "injuries from radiation" and "other thermal hazards".	**all phases of life**	L		K	GR	2	PIK: On touchable surfaces that reach temperatures above +45 °C, a pictogram (according to EN ISO	EN ISO 12100 EN ISO 7010 EN ISO 13732-1 EN 61984	L		M	GR	1	pictogram(s) attached to the connector including cable entry system?

No.	Form B Hazard	Life phase(s)	Risk assessment					Risk reduction		Residual risk assessment					Test criterion, comment
			SA	AD	EA	WE	RF	Solution	standard	SA	AD	EA	WE	RF	
								13732-1 and ISO 7010, "Caution hot surface") must be clearly visible.							
			L		M	GR	1	BA: Explain the pictogram. Avoid contact with hot surfaces. Keep the connector including cable entry systemaway from flammable or heat-sensitive parts, or shield it from them. Ensure that adequate heat dissipation is guaranteed. Carefully monitor the temperatures during commissioning.	EN ISO 12100 EN 61984	L		M	KL	0	
4. Hazards from noise															
4.1															
5 Hazards from vibration															
5.1	Vibrations promote the loosening of connections, fastenings, and components. This leads to unexpected stopping or ejection of parts.	**T, M, N, W**	L		K	GR	2	ISK: All connections, fasteners and components are professionally screwed together. The assembly of the connector including cable entry system This may only be done by authorized and trained specialists. During assembly, observe the tightening torques of all screw connections. Check for correct assembly before commissioning (completeness, dimensions, tightening torques).	EN ISO 12100 EN 61984	L		M	KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment SA	AD	EA	WE	RF	Risk reduction Solution	standard	Residual risk assessment SA	AD	EA	WE	RF	Test criterion, comment
6. Hazards from radiation															
6.1															
7 Material/substance hazards															
7.1	Dangers from hazardous connector including cable entry system	**all phases of life**	L		K	GR	2	ISK: For all components used in the connector including cable entry systemconfirmation of compliance with the 2011/65/EU Directive on the restriction of the use of certain hazardous substances must be available.	EN ISO 12100 EN IEC 63000 EN 61984	L		M	KL	0	
7.2	During assembly/disassembly work, there is a risk of skin or eye irritation from dust being stirred up. 	**M, D**	L		K	GR	2	PSA: Closed protective clothing, protective gloves and eye protection (for overhead work).	EN ISO 12100 EN 61984	K			KL	0	
			K			KL	0	BA: Define and use PPE. Refer to the safety data sheets (if applicable).	EN ISO 12100 EN 61984	K			KL	0	

No.	Form B Hazard	Life phase(s)	Risk assessment SA	AD	EA	WE	RF	Risk reduction Solution	standard	Residual risk assessment SA	AD	EA	WE	RF	Test criterion, comment
8 Ergonomic hazards															

8.1
Failure to comply with ergonomic principles can lead to various hazards.

N
S
H
M
MI
4

ISK:
Ergonomic measures include:
- Possibility of adapting to differences in body dimensions, physical strength and endurance of the operating personnel.
- Sufficient freedom of movement for the body parts of the operating personnel.
- Avoidance of a work rhythm dictated by the connector including cable entry system.
- Avoidance of monitoring activities that require constant attention.

product interface Productmeasures are DOCPROPERTY Dokumententyp * MERGEFORMAT subsequently evaluated to determine whether all requirements of the product directive are met. We strongly recommend that the fundamental safety and health requirements of the Low Voltage Directive 2014/35/EU Annex I be reviewed before the actual commissioning of the connector including cable entry system The checklist must be compared with the actual circumstances and, if necessary, adjusted or have adjusted. The manufacturer must review the checklist and supplement it if necessary .

Requirement met 

Requirement partially met

Requirement not met 

The requirement is no longer required —

If a point is not fulfilled, the following table describes recommendations or requirements.

Sub-item	remark
§ 51 Security Objectives	
1. General Terms and Conditions	– (a) The essential characteristics, knowledge and observance of which are necessary for the proper and safe use of the electrical equipment, must be indicated on the electrical equipment or, if this is not possible, on an accompanying document. – (b) The electrical equipment and its components must be designed so that they can be safely and correctly installed and connected. – (c) Electrical equipment must be designed and manufactured in such a way as to ensure protection against the hazards listed in points 2 and 3 when used as intended and properly maintained.
2. Protection against hazards that may arise from electrical equipment. Technical measures must be defined in accordance with point 1 to ensure that:	– (a) Humans and domestic and farm animals are adequately protected from the dangers of injury or other damage that may be caused by direct or indirect contact, – (b) no temperatures, arcs or radiations are generated which could pose a hazard – (c) People, domestic and farm animals and property are adequately protected from non-electrical hazards which experience has shown to emanate from electrical equipment, – (d) the insulation is adequate for the intended stresses.
3. Protection against hazards that may arise from external influences on electrical equipment. Technical measures must be defined in accordance with point 1 to ensure that the electrical equipment:	– (a) withstand the intended mechanical stresses to such an extent that people, domestic and farm animals and property are not endangered, – (b) under the intended environmental conditions, withstand non-mechanical influences to such an extent that humans, domestic and farm animals and property are not endangered, – (c) that people, domestic and farm animals and property are not at risk in the foreseeable overload conditions.
§ 52 Which safety aspects are addressed in the directive?	

Sub-item	remark
Like its predecessor, the new Low Voltage Directive 2014/35/EU is a "comprehensive harmonized safety directive" in the sense that it considers all safety aspects of electrical equipment, not just electrical risks. The directive addresses all risks that may arise from the use of electrical equipment; that is, not only electrical, but also mechanical, chemical (e.g., in particular, the emission of corrosive substances), and all other risks. The directive also considers health aspects such as noise and vibration, and ergonomic aspects where ergonomic requirements must be met to ensure protection against hazards as defined by the directive.	–

Sub-item	remark
§ 53 General Conditions	
The Low Voltage Directive requires that the necessary information be attached to the electrical equipment (or, in certain cases, provided with it) in such a way that the user can safely assemble, install and maintain the electrical equipment as intended by the manufacturer and that the electrical equipment is used safely in the application for which it is intended.	–
§ 54 Protection against hazards that may emanate from electrical equipment Section 2 of Annex I requires technical measures to reduce risks arising from electricity (through direct or indirect contact) or from non-electrical hazards.	
Subparagraph (a) concerns the risk, e.g., electric shock, arising from direct contact, i.e., touching live parts of electrical equipment (e.g., wires) as a matter of function, or from indirect contact, i.e., touching parts of electrical equipment (e.g., the enclosure) that are only live in the event of a fault. One of the means of reducing this risk and providing a certain level of protection is insulation (of live parts of electrical equipment), which, according to subparagraph (d), must be "suitable for foreseeable conditions".	–
Paragraph (b) does not cover electrical hazards such as temperature, arcing, or radiation. Radiation aspects are limited to those directly relevant to the health and safety of humans and domestic animals, excluding electromagnetic disturbances as defined in the EMC Directive (2014/30/EU), insofar as they do not affect safety. All electromagnetic aspects related to safety, including functional safety, are covered by the Low Voltage Directive. This includes effects caused by electrical equipment emitting electromagnetic fields. For products emitting ionizing radiation, EURATOM guidelines should also be taken into account.	–
Subparagraph (c) deals with non-electrical hazards arising from the use of electrical equipment which, based on experience, presents, for example, mechanical risks from moving parts, sharp edges, etc.	–
Subparagraph (d) deals with the insulation of an electrical device mentioned in subparagraph (a) above.	–

Sub-item	remark
§ 55 Protection against hazards that may arise from external influences on electrical equipment Section 3 of Annex I requires technical measures to reduce risks arising from external influences affecting the electrical equipment:	
Subparagraph (a) concerns mechanical influences that could pose a hazard. For example, this could mean that the electrical equipment requires a suitable enclosure to withstand these mechanical influences.	–
Paragraph (b) does not concern mechanical influences under expected environmental conditions. This means, for example, that when using electrical equipment outdoors, the effects of rain must be taken into account.	–
Subparagraph (c) deals with foreseeable overload conditions. For example, cables have a maximum operating current. Exceeding this maximum current can lead to dangerous situations. As a technical measure, a circuit breaker for overcurrent protection can prevent such a dangerous situation.	–

7.1 Action plan

7.1.1 Implementation of the Risk assessment

We strongly recommend that the resulting Risk assessment before the actual commissioning of the connector including cable entry system to compare with the actual circumstances and, if necessary, to make improvements or have improvements made. Verification and validation must icotek GmbH. The Original operating and installation instructions should be supplemented accordingly if they are not created by Technical Documentation CE .

7.1.2 Testing of electrical equipment

The Risk assessment does not include testing the electrical equipment of the connector including cable entry system. It is assumed that the electrical equipment has been tested and documented by a qualified person of the operator in accordance with the requirements of the Low Voltage Directive, EN 61984, EN IEC 60664-1 and EN 60529.

7.1.3 Supplier documentation

The supplier documentation for purchased parts (EU/EC declarations of conformity and RoHS confirmations) must be obtained for the company's own technical documentation.

7.1.4 Pictograms

Missing pictograms must be added to the connector including cable entry system They must be affixed. Detailed information on the missing pictograms can be found in chapter " 7.2 Pictograms.

7.1.5 Type plate

A type plate is missing and must be attached. The connector including cable entry system must be marked with a type plate containing the following information:

- Manufacturer
- Type / Designation / Number / Serial number (if applicable) / Date of manufacture
- Maximum permissible supply voltage, current, and power consumption
- CE marking and other pictograms (see 7.2 Pictograms/ Other symbols)

7.1.6 Signature card and compliance checklist

Signature card Chapter 7.4 Fill out Signature card nand the checklists from chapter 7.5 Check Compliance for completeness and tick off the relevant items.

7.1.7 Guidelines, standards and technical rules

Missing guidelines/regulations, standards and technical rules (Chapter “ 5 Guidelines and standards should be obtained and applied.

7.2 Pictograms

Warning of hazards at the connector including cable entry system Affix the following pictograms in a clearly visible location:

pictogram	Explan	Placement location
Other characters		
	Functional grounding	At the connector including cable entry system.
1, 2, 3	Pay	Contact chambers
	CE marking	On the type plate or in its immediate vicinity.

7.3 Personal protective equipment (PPE)

PSA	Explan
	Safety shoes To protect against heavy falling parts or slipping on smooth surfaces, wear non-slip safety shoes (during transport, assembly, commissioning, operation, malfunctions, maintenance/cleaning, decommissioning, dismantling, and disposal). Personal protective equipment must be designed specifically for the relevant risk.
	Workwear Workwear is close-fitting work clothing with low tear resistance, close-fitting sleeves, and no protruding parts. It primarily serves to protect against contact with components (during transport, assembly, operation, commissioning, malfunctions, maintenance/cleaning, decommissioning, dismantling, and disposal). Personal protective equipment must be designed specifically with regard to the corresponding risk.

PSA	Explan
	protective gloves Wear protective gloves to protect your hands from friction, abrasions, punctures, or deeper injuries, as well as from contact with hot surfaces or chemical substances (during transport, assembly, operation, commissioning, malfunctions, maintenance/cleaning, decommissioning, dismantling, and disposal). Personal protective equipment must be designed specifically for the relevant risk.
	Safety goggles Wear safety glasses to protect yourself from flying debris (during transport, assembly, operation, commissioning, malfunctions, maintenance/cleaning, decommissioning, disassembly, and disposal). Personal protective equipment must be designed specifically for the given risk.

7.4 Signature card n

The signature signifies the responsibility for completeness, compliance with guidelines and standards of the respective task and responsibility area for the connector including cable entry system Confirmed. The signature card must be completed by the Productmanufacturer.

7.4.1 Signature card construction and safety concept

Area of responsibility	name	Function in the company	Date	Signature	comment
construction		e.g., design engineer			
Creation of the security concept		e.g., design engineer			

7.4.2 Signature card Electrical engineering

Area of responsibility	name	Function in the company	Date	Signature	comment
Subfield of electrical engineering		e.g. electrician			

7.4.3 Signature card mechanical manufacturing

Area of responsibility	name	Function in the company	Date	Signature	comment
sub-area of mechanical manufacturing		e.g. mechanics			

7.4.4 Signature card documentation

Area of responsibility	name	Function in the company	Date	Signature	comment
Technical Documentation sub-area		e.g. authorized representative for technical documentation			

7.5 Compliance Checklist

7.5.1 Generally

The following points must be considered for the connector including cable entry system must be fulfilled:

☐The identified hazards listed in the documentation were fully recorded and adequately mitigated – supplemented where necessary.

☐The EU declaration of conformity was signed by a representative of the manufacturer.

☐All necessary information has been provided.

☐At least the following information must be clearly visible, legible and permanently affixed: see section “ 7.1.5 Type plate.

☐For series production: a concept for production control and quality assurance in accordance with the directive is available. The technical documentation must be kept for ten years after the manufacture of the (last) connector including cable entry system be stored.

☐For all applicable purchased components of the connector including cable entry system Documentation that complies with guidelines is available. The lack of instructions for action is considered a safety hazard.

7.5.2 Technical documentation:

The technical documentation must contain the following:

☐A general description of the electrical equipment (if applicable).

☐The technical documentation has been completed: such as manufacturing drawings and plans of components, subassemblies, descriptions, calculations, protocols, technical reports, test documents, documentation of the supplied parts used (EU/EC declarations of conformity, RoHS certificates).

☐necessary for understanding these drawings and plans, as well as the operation of the connector including cable entry system

☐The Original operating and installation instructions are available in the official languages of the user's country.

☐A list of the harmonized standards that were applied.
(If no harmonized standards were applied, the technical documentation must include descriptions of the solutions chosen to meet the essential requirements of the relevant directives (Low Voltage Directive, RoHS Directive), including a list of other relevant technical specifications applied. In the case of partially applied harmonized standards, the technical documentation must specify which parts were applied.)

☐Results of design calculations, tests performed, etc.

☐EU Declaration of Conformity

☐RoHS documents:

- ☐Documents for materials, parts and/or subassemblies
- ☐Information showing the relationship between the documents and the corresponding materials, parts and/or subassemblies
- ☐Supplier declarations and/or contractual agreements, and/or
- ☐Material declarations, and/or
- ☐Analytical test results

7.5.2.1 Low Voltage Directive

If the electrical equipment is designed for use with a nominal voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current, the technical documentation must additionally include the following:

☐ Low-voltage test reports

Enclosed you will find important parts of the technical documentation for your product. Before commissioning, please ensure that the requirements of the directive are met. This checklist provides an overview of what still needs to be done to achieve CE conformity. Once all items have been completed, file this list, dated and signed, in the "archive folder" to document proper execution.

All relevant points on the checklist are fulfilled.

_____ _____

Place and date Signature of responsible person