



Translation of the operating instructions

IO1000

I/O-Modul

Catalog No.
560-310

From software version
I/O-Modul 1.15

jiqc10en1-08-(2507)



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1 About these instructions

1.1 Target groups


This instruction manual is intended for operators and technically qualified personnel with experience in leak detection technology and the integration of leak detectors in leak detection systems. In addition, the installation and use of the device require knowledge of electronic interfaces.

1.2 Other associated documents

Operating instructions of the connected leak detector	
LDS3000 Interface Protocols	jira54
HLD6000 Interface Protocols	kirb43


1.3 Explanation of warnings



**DANGER**


Imminent hazard resulting in death or serious injuries



**WARNING**

Hazardous situation resulting in potential death or serious injuries



**CAUTION**

Hazardous situation resulting in minor injuries

NOTICE

Hazardous situation resulting in damage to property or the environment

2 Safety

2.1 Intended use

The I/O module is a device interface between a leak detector and an external controller.

- Install and use the device only in accordance with these instructions.
- Use the device only in dry indoor rooms and in an industrial environment.

Incorrect usage

Avoid the following unintended uses:

- Use outside the technical specifications, see "Technical Specifications"
- Use outside the specification of the inputs or outputs, see "Construction of the unit [► 8]"
- Connection of voltages that are dangerous to touch
- Use of a fuse that does not comply with the specification
- Use of incorrect cables and lines, see "Construction of the unit [► 8]"
- Operation outside the permissible ambient conditions
- Using the device in potentially explosive atmospheres
- Use in radioactive areas
- Connecting a non-compatible device to the RS232 or RS485 interface

Note: This device is not intended to be used in living areas.

2.2 Duties of the Operator

- Read, observe, and follow the information in this manual and in the work instructions provided by the owner. This concerns in particular the safety and warning instructions.
- Always observe the complete operating instructions for all work.
- If you have any questions about operation or maintenance that are not answered in this operating instructions, contact INFICON service.

2.3 Owner Requirements

The following notes are for companies or any person who is responsible for the safety and effective use of the product by the user, employees or third parties.

Safety-conscious operation

- Operate the device only if it is in perfect technical condition and has no damage.
- Only operate the device properly in accordance with this instruction manual, in a safety and risk conscious manner.
- Adhere to the following regulations and observe their compliance:
 - Intended use
 - Universally valid safety and accident prevention regulations
 - International, national and local standards and guidelines
 - Additional device-related provisions and regulations

- Only use original parts or parts approved by the manufacturer.
- Keep this instruction manual available on site.

Personnel qualifications

- Only instructed personnel should be permitted to work with and on the device.
The instructed personnel must have received training on the device.
- Make sure that authorized personnel have read and understood the instruction manual and all other applicable documents.

3 Scope of delivery and transport

Item	Quantity
I/O module	1
Operating manual	1

- Check the scope of delivery of the product for completeness after receipt.

Transport

NOTICE

Damage due to unsuitable packaging material

Transport in unsuitable packaging material can damage the device.

- Only transport the device in its original packaging.
- Keep the original packaging.

4 Description

4.1 Construction of the unit

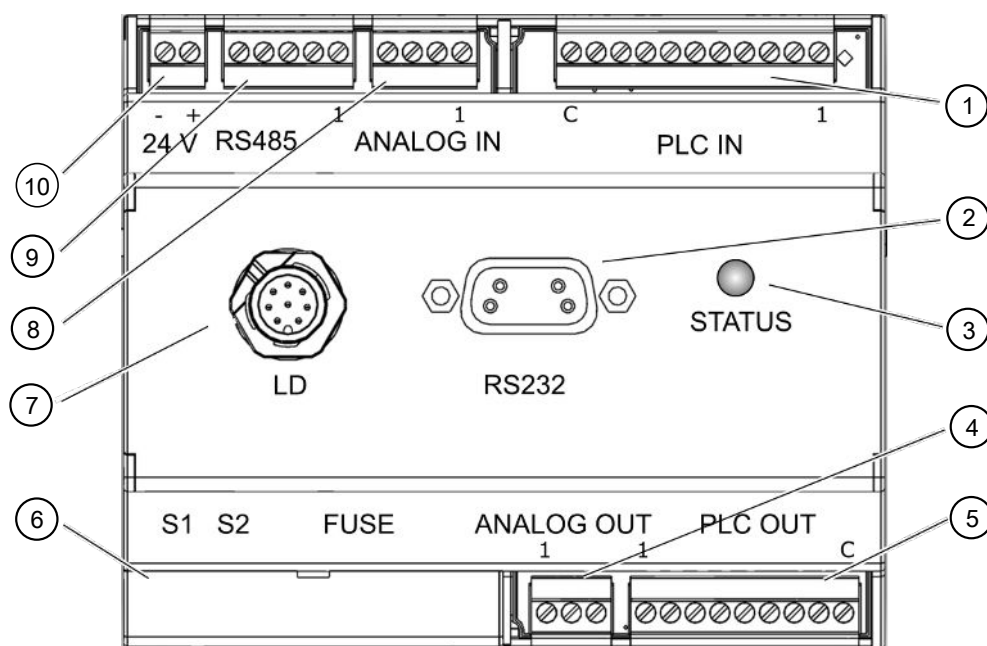


Fig. 1: View from above

1	PLC IN, digital inputs	6	DIP switch cover and fuse
2	RS232	7	LD, connection of leak detector
3	Status LED	8	ANALOG IN, analog inputs
4	ANALOG OUT, analog outputs	9	RS485
5	PLC OUT, digital outputs	10	24 V OUT, 24 volt output



Maximum cable length

The maximum cable length for all connections is 3 m, unless otherwise specified.

Fig. 1, point 1

PLC IN

Digital inputs

Galvanic isolation (max. 60 V DC, 25 V AC against GND)

maximum permissible input voltage: $U = 35 \text{ V}$

Active signal: $V = 13 \dots 35 \text{ V}$ (typical 24 V), $I = \text{approx. } 7 \text{ mA}$

Inactive signal: $U < 7 \text{ V}$ (typical 0 V), $I = 0 \text{ mA}$

A signal on these digital inputs must have a minimum length of 100 ms, so that it can be safely evaluated.

The functions of the input pins PLC-IN 1 to PLC-IN 10 can be freely configured in the software of the connected leak detector.

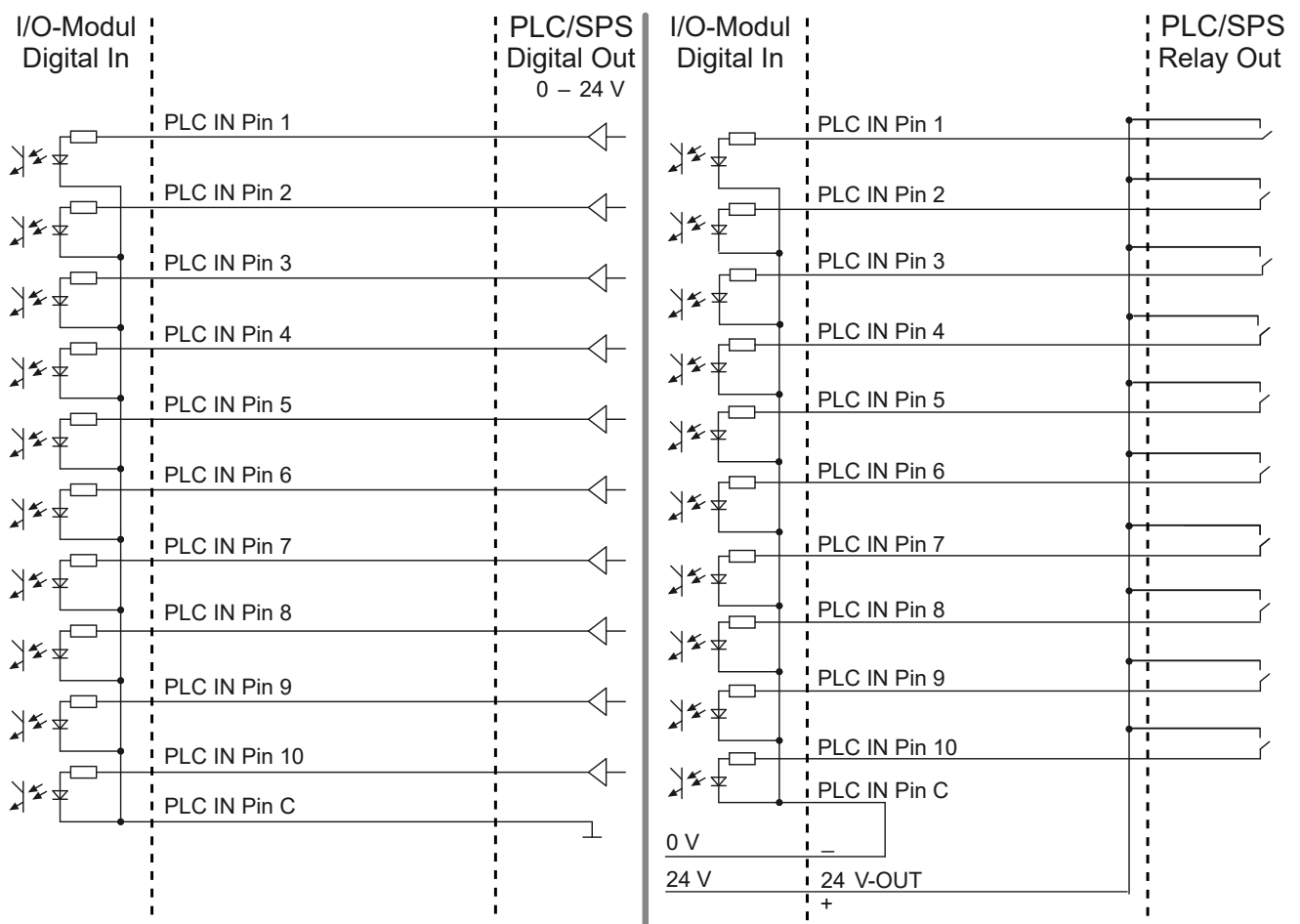


Fig. 2: Sample wiring, digital inputs with PLC. Left: Driver outputs, right: Potential-free contacts

Fig. 1, point 2

RS232

Connection for RS-232

Galvanic isolation (max. 60 V DC, 25 V AC against GND)

Pin assignment:

Pin	Name
2	TxD
3	RxD
5	GND

To connect the ports, a normal RS-232 cable must be used (1:1 connection, RxD and TxD not crossed, no null modem cable). Maximum cable length: 30 m, shielded.

- Switch off the RS-232 hardware handshake in the RS-232 control program.

If the hardware handshake cannot be deactivated, the RS-232 can be used as follows:

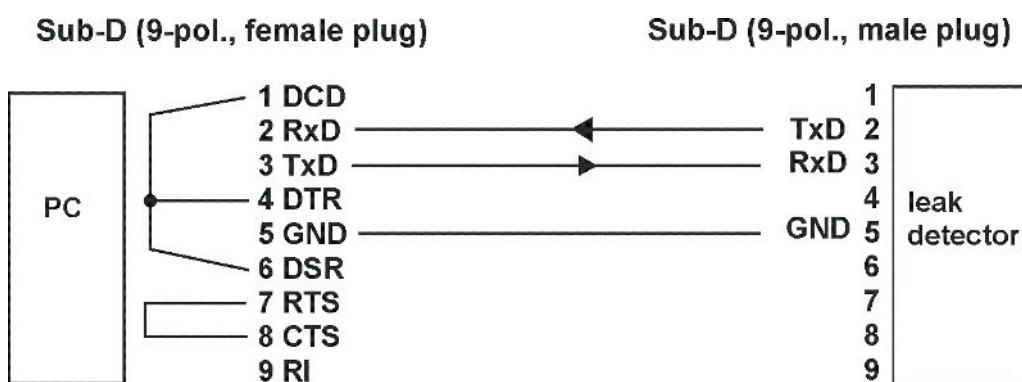


Fig. 3: Connection with RS-232 cable (in case hardware handshake cannot be deactivated)

Fig. 1, point 3

Status LED

Color	Status	Meaning
Red	illuminates	Device not functional or defective
Red	flashes	Not ready for operation, communication to leak detector is not available
Cyan	illuminates	Ready for operation; communication to leak detector available
Green	Flashes quickly	Boot loader active, ready for software update
Green	Flashes slowly	Data reception on RS232
Yellow	Flashes slowly	Data reception on RS485
–	off	No operating voltage

Fig. 1, point 4

ANALOG OUT

Analog outputs (for example for logging leak rate and backing pressure)

Galvanic isolation (max. 60 V DC, 25 V AC against GND)

Voltage range	0 ... 10V
Precision	$\pm 15\text{mV}$ offset, additional $\pm 1\%$ from measurement (current output voltage) as linearity error (at 25°C)
Resolution	typ. 2.5mV
Load	> 10 k Ω

Pin assignment:

Pin	Name
1	Analog output 1: ANALOG-OUT 1
2	Analog output 2: ANALOG-OUT 2
3	GND to analog output

The functions of all outputs can be freely configured in the software of the connected leak detector.

Fig. 1, point 5

PLC OUT

Digital outputs

Galvanic isolation (max. 60 V DC, 25 V AC against GND)

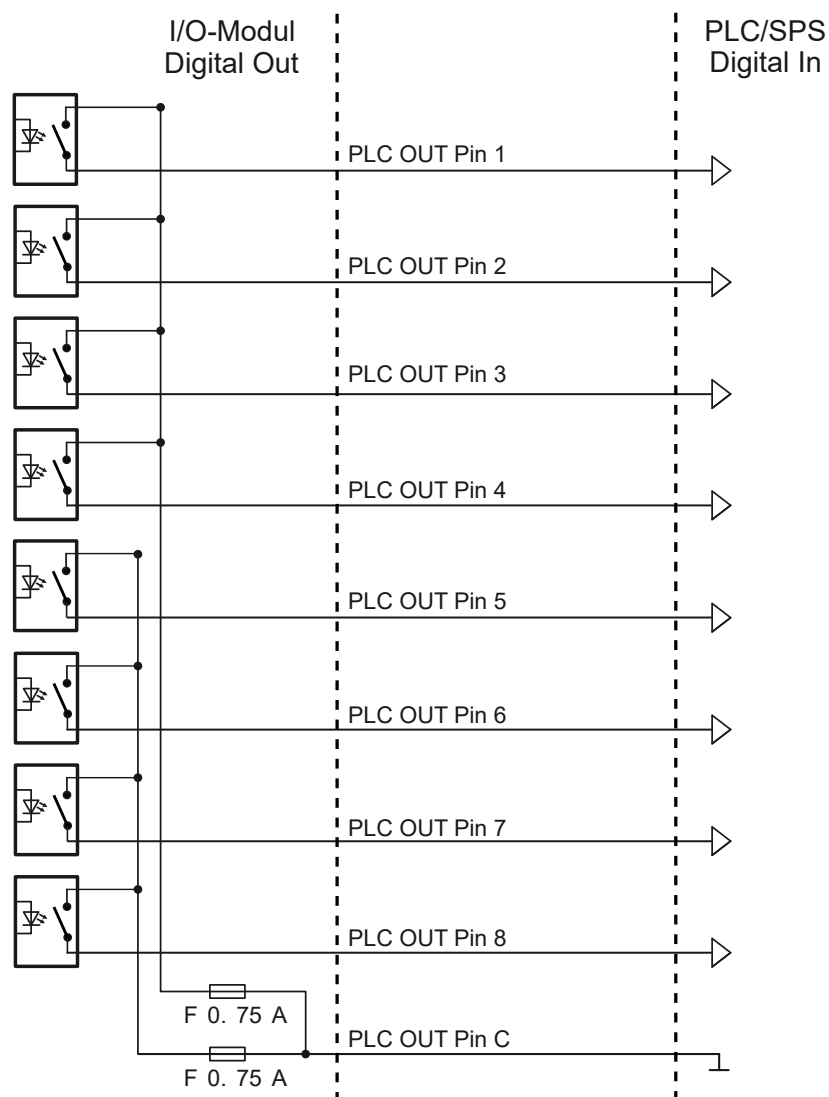
maximum permissible load each output: $U = 30 \text{ V}$, $I = 0.75 \text{ A}$ Fuses for digital outputs 1 ... 4 and 5 ... 8: $2 \times 0.75 \text{ A}$ 

Fig. 4: Sample wiring, digital outputs

Fig. 1, point 6

FUSE and DIP switch S1, S2

Fuses for digital outputs and DIP switches (under the cover)

F201:

Fuse for digital outputs 1 ... 4

F202:

Fuse for digital outputs 5 ... 8

Fuse type: Fuse 0.75 A; fast-blow; 125 VAC/DC; 7 x 2 mm

(Schurter: 7010.9800.xx)

DIP switch S1	LDS3000	HLD6000	Contact			
			4	3	2	1
Factory setting (default value of the interface protocol by the leak detector or control unit)	•	•	0	0	0	0
ASCII protocol	•	•	0	0	1	0
LD protocol	•	•	0	0	1	1
Binary protocol	•		0	1	0	1
LDS1000 protocol	•		0	1	1	0
Normal protocol		•	0	0	0	1
Simple protocol		•	0	1	0	0

1 = ON, 0 = OFF

DIP switch S2	Contact			
	4	3	2	1
Activate boot mode for software update	X	+	0	0
Disable bus terminator 120Ω for RS-485	1	X	0	0

1 = ON, 0 = OFF, + = switching from OFF to ON during operation, X = random

Fig. 1, point 7

Connection LD

Connection for the data cable to the leak detector

Cable length of the INFICON data cable < 30 m

Fig. 1, point 8

ANALOG IN

Analog input (input voltage range 0V to 10.8V)

Pin assignment:

Pin	Name
1	24V supply (output)
2	GND to 24V supply
3	Analog input (0V to 10.8V)
4	GND to analog input

Fig. 1, point 9

RS485

Connection for RS-485

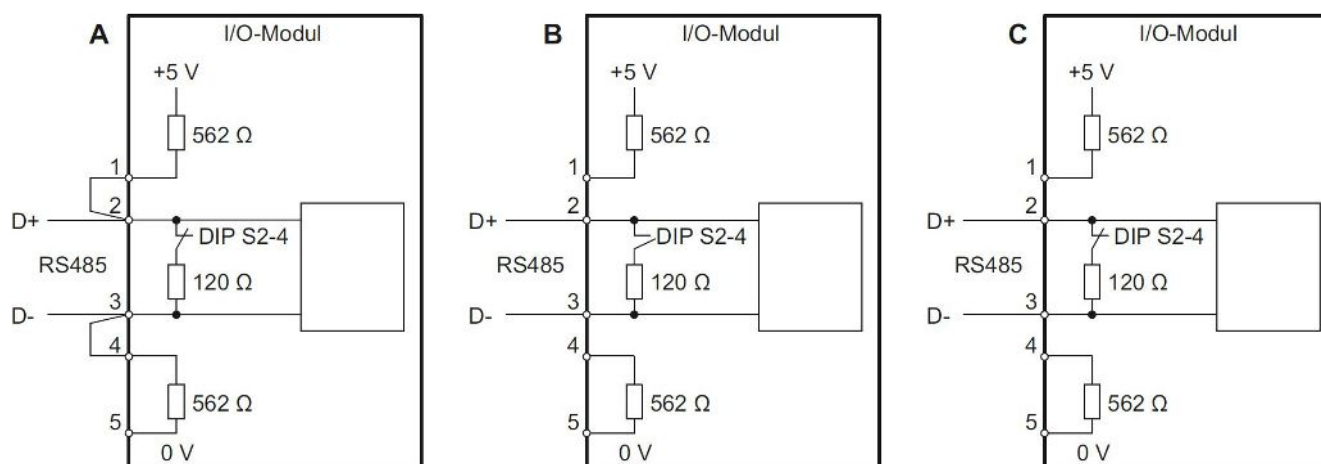


Fig. 5: RS-485 bus terminator

A	Active bus terminator
B	Without bus terminator
C	Passive bus terminator

Galvanic isolation (max. 60 V DC, 25 V AC against GND)

Pin assignment:

Pin	Name
1	Connect pull-up resistor (562Ω against +5V) with D+ if necessary
2	D+
3	D-
4	Connect pull-down resistor (562 Ω against GND) with D- if necessary
5	COM

The bus terminator integrated in the I/O module (120 Ω) between D+ and D can be disabled via DIP switches S2-4. The BUS address is 1. BUS operation with more than two subscribers is not possible.

Fig. 1, point 10

24V OUT

24V output

Pin assignment:

Pin	Name
+	+ 24V
-	GND

The I/O module is supplied with voltage by the leak detector and requires no separate power supply. The 24V output is not used for voltage supply to the I/O module.

The 24V output of the I/O module can be used as an active signal for the PLC inputs and outputs.

The maximum current that can be drawn from this output is limited by the leak detector connected to the LD interface. The current for extraction must not exceed 0.5 A.

4.2 Function

The device is an interface between the leak detector and an external controller. It is equipped with

- one RS-232 connection
- one RS-485 connection
- one analog input
- ten digital inputs
- two analog outputs
- eight digital outputs

The actual function is determined by the software of the connected leak detector.

4.3 Technical data

Mechanical data

	IO1000
Dimensions (L × W × H)	108mm x 90mm x 78mm

Electrical data

	IO1000
Operating voltage	24 V ±10%
Max. current consumption	0.8A
Max. current output at the 24V output	0.5A
Protection class	EN 60529 IP20 UL 50E type 1

Ambient conditions

	IO1000
Max. altitude above sea level	2000 m
Max. relative humidity above 40°C	50 %
Max. relative humidity from 31°C to 40°C	80% bis 50% (linearly decreasing)
Max. humidity up to 31 °C	80 %
Storage temperature	-20°C - 60°C
Ambient temperature	+5°C ... +50°C
Degree of contamination	II

5 Installation and removal

- Use the device only in a dry environment and only inside buildings.

5.1 Mount device on DIN-TS35 top hat rail

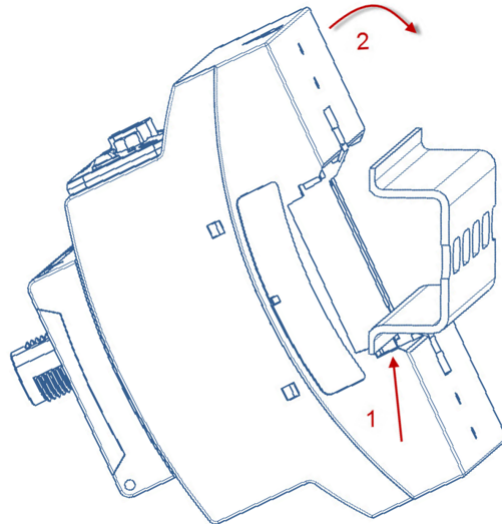


Fig. 6: Mount the device

- 1 Hook device on top hat rail at bottom.
- 2 Press device onto top hat rail at top.

5.2 Establish connections

Connecting I/O module with leak detector

The I/O module communicates via data cable with the leak detector and is supplied with voltage by the data cable.

- 1 Connect I/O module (connection "LD") via data cable with leak detector (connection "I/O Anybus").
- 2 Connect I/O module via desired interfaces with external controller:
 - RS232 (RS-232 interface)
 - RS485 (RS-485 interface)
 - Analog In (analog input)
 - Analog Out (analog outputs)
 - PLC In (digital inputs)
 - PLC Out (digital outputs)

5.3 Remove the I/O module from the DIN-TS35 top hat rail

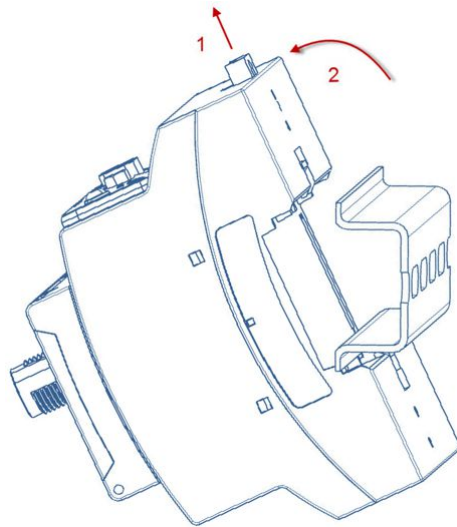


Fig. 7: Removing the I/O module

- 1 Use the flat-tip screwdriver to pull out the locking device.
- 2 Pull the device off of the top hat rail.

6 Disposing of the device

The device can either be disposed of by the operator or be sent to the manufacturer. The device consists of materials that can be recycled. This option should be exercised to prevent waste and also to protect the environment.

During disposal, observe the environmental and safety regulations of your country.



Device cannot be disposed of as normal domestic waste.

7 CE Declaration of Conformity



EU Declaration of Conformity

We – INFICON GmbH - herewith declare that the products defined below meet the basic requirements regarding safety and health and relevant provisions of the relevant EU Directives by design, type and the versions which are brought into circulation by us. This declaration of conformity is issued under the sole responsibility of INFICON GmbH.

In case of any products changes made, this declaration will be void.

Designation of the product:

IO Modul

Models:

IO1000

The products meet the requirements of the following Directives:

- **Directive 2014/30/EU (EMC)**
- **Directive 2011/65/EU (RoHS)**

Applied harmonized standards:

- **EN 61326-1:2013**
Class A according to EN 55011
- **EN IEC 63000:2018**

Catalogue numbers:

560-310

Cologne, March 23rd, 2023

p.p. 
Dr. H. Bruhns, Vice President LDT

Cologne, March 23rd, 2023


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8 RoHS

Restriction of Hazardous Substances (China RoHS)

有害物质限制条例（中国 RoHS）

	IO1000: Hazardous Substance IO1000: 有害物质					
Part Name 部件名称	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr(VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
PCB Mainboard PCB主板	X	O	O	O	O	O
PCB Interface board PCB接口板	X	O	O	O	O	O
Cable Connectors 电缆借口	X	O	O	O	O	O
<p>This table is prepared in accordance with the provisions of SJ/T 11364. 本表是根据 SJ/T 11364 的规定编制的。</p> <p>O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572. O: 表示该部件所有均质材料中所含的上述有害物质都在 GB/T 26572 的限制要求范围内。</p> <p>X: Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. X: 表示该部件所使用的均质材料中，至少有一种材料所含的上述有害物质超出了 GB/T 26572 的限制要求。</p> <p>(Enterprises may further provide in this box technical explanation for marking “X” based on their actual circumstances.) （企业可以根据实际情况，针对含“X”标识的部件，在此栏中提供更多技术说明。）</p>						

