

IO1000

I/O module

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560-310
I/O module 1.0
jjqc10en1-b (1301)

This document applies to the software version stated on the cover page. If you need a different version, please contact our sales staff.

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1 About this manual

1.1 Target groups

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

1.2 Other applicable documents

Installation manual for mass spectrometer module j1qa54
Interface protocols j1ra54

1.3 Presentation of information

1.3.1 Warnings



1.3.2 Text markings

Marking	Meaning
✓	Requirement for execution of an action
✕	Tool or aid for an action
▶	Instruction
1, 2, 3, ...	Several instructions in a fixed order
⇒	Result of an action
SMALL CAPS	Designation of the unit or command/term from the menu
Information	Useful tips and information

2 Safety

2.1 Intended use

The I/O module is a device interface between the MSB box of the mass spectrometer module LDS3000 and an external controller, for example.

- ▶ Install, operate and service the unit only in compliance with this manual.
- ▶ Comply with the limits of application (see [Chapter 4.3, page 14](#)).

2.2 User requirements

Safety conscious operation

- ▶ Operate and install the unit only if it is in perfect working order and as intended, in a safety-conscious manner and fully aware of dangers, in compliance with this manual.
- ▶ Fulfill and ensure compliance with the following regulations:
 - Intended use
 - Generally applicable safety and accident prevention regulations
 - International, national and local standards and guidelines
 - Additional provisions and regulations that are specific to the unit
- ▶ Use only original parts or parts approved by the manufacturer.
- ▶ Keep this manual available at the operating site.

Personnel qualifications

- ▶ All work must be performed only by technical specialists who have been trained on the unit.
- ▶ Allow personnel in training to work with the unit only under the supervision of technical specialists.
- ▶ Make sure that the authorized personnel have read and understood this manual and all other applicable documents (see [Chapter 1.2, page 4](#)), especially the information on safety, maintenance and repairs, before starting work.
- ▶ Define responsibilities, authorizations and supervision of personnel.

2.3 User requirements

- ▶ Read, observe and follow the information in this manual and the working instructions created by the owner, especially the safety instructions and warnings.
- ▶ Perform all work based on the complete manual.

3 Shipment check, transport, storage

3.1 Checking shipment

Scope of delivery

Article	Quantity
I/O module	1
Installation manual	1

- ▶ Check shipment to make sure it is complete.

3.2 Transport

NOTICE

Damage due to unsuitable packaging material

Transport in unsuitable packaging material can damage the unit.

- ▶ Transport the unit only in the original packaging material.
- ▶ Keep original packaging material.

3.3 Storage

- ▶ Always store the unit in compliance with the technical data, see [Chapter 4.3, page 14](#).

4 Description

4.1 Construction of the I/O module

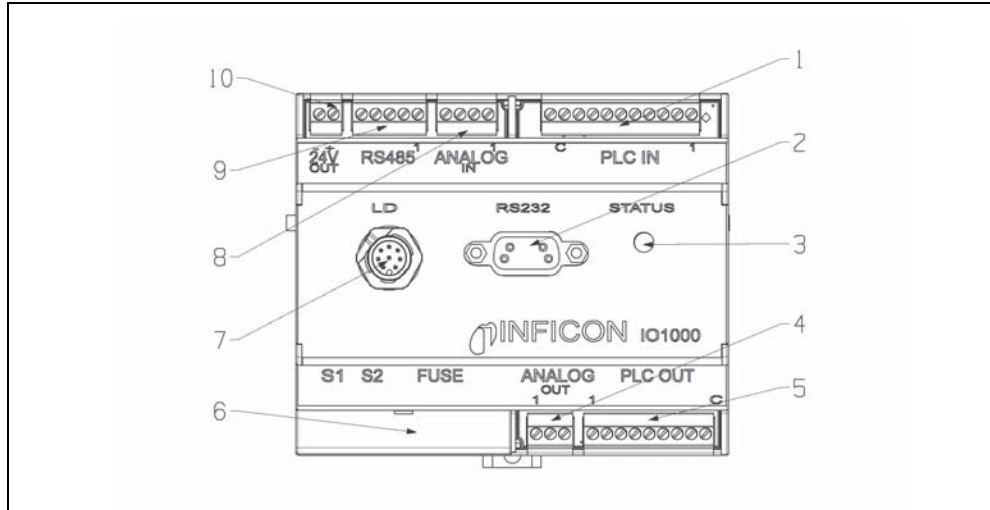


Fig. 1 Front view

1 - PLC IN

Digital inputs

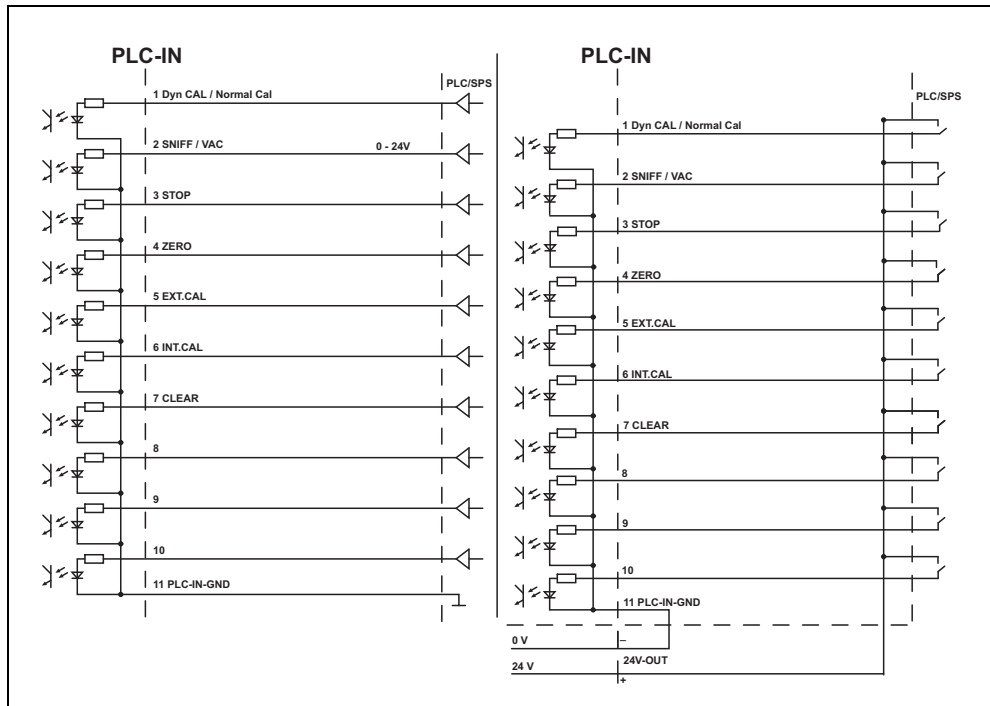


Fig. 2 Digital inputs

Electrical insulation (max. 60 V DC, 25 V AC against GND)

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

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

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

Connection plug arrangement

The digital inputs can be freely configured.

Pin	Name	Factory setting mass spectrometer module
1	PLC-IN 1	Dyn CAL / Normal Cal
2	PLC-IN 2	SNIFF/VAC
3	PLC-IN 3	STOP
4	PLC-IN 4	ZERO
5	PLC-IN 5	EXT.CAL
6	PLC-IN 6	INT.CAL
7	PLC-IN 7	CLEAR
8	PLC-IN 8	-
9	PLC-IN 9	-
10	PLC-IN 10	-
11	PLC-IN-COM	COM

- For other layouts, see installation manual for mass spectrometer module LDS3000.

Key-operated switch

An external key switch with up to three switching outputs can be connected via three PLC inputs. The key switch can be used to select the access level of the user of the control unit.

Key 1 - Operator

Key 2 - Supervisor

Key 3 - Integrator

Example for a suitable key switch: Hop + Schuler, No. 444-05

2- RS232

Connection for RS-232

Electrical insulation (max. 60 V DC, 25 V AC against GND)

Connection plug arrangement

Pin	Name
2	TxD
3	RxD
5	GND

A normal RS-232 cable must be used for the connection (1:1 connection, RxD and TxD not crossed, no zero-modem cable).

- Deactivate RS-232 hardware handshake in RS-232 control program.

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

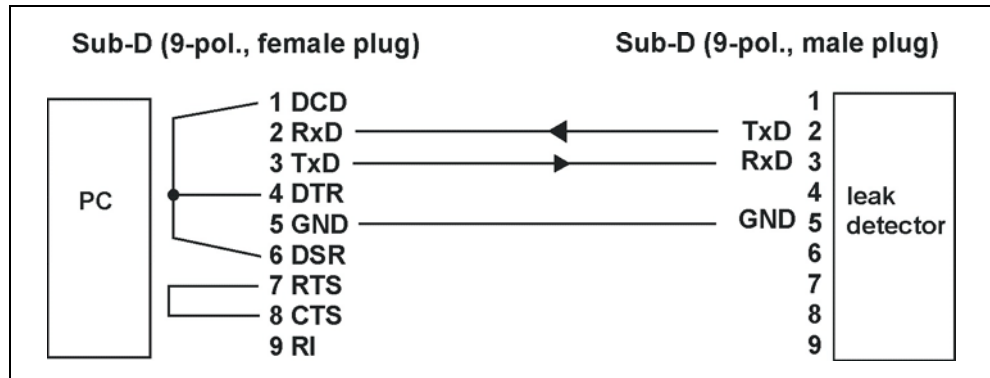


Fig: 3 Connection with RS-232 cable (in case hardware handshake cannot be deactivated)

3 - STATUS

Status LED

Color	Status	Meaning
Red	illuminates	Unit not functional or defective
Red	flashes	Not ready for operation, communication to mass spectrometer module is not available
Cyan	illuminates	Ready for operation; communication to mass spectrometer module 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

4 - ANALOG OUT

Analog outputs (for logging leakage rate and backing pressure)

Electrical insulation (max. 60 V DC, 25 V AC against GND)

Voltage range	0 ... 10 V
Precision	±15 mV offset, additional ±1% from measurement (current output voltage) as linearity error (at 25 °C)
Resolution	typ. 2.5 mV
Load	> 10 kΩ

Connection plug arrangement

The analog outputs can be freely configured.

Pin	Name	Factory setting mass spectrometer module
1	ANALOG-OUT 1	Leak rate mantissa 1 ... 10 V; linear; in used unit
2	ANALOG-OUT 2	Leak rate exponent 1 ... 10 V; 0.5 V / decade; step function; 1 V = 1 x 10 ⁻¹² ; in used unit
3	ANALOG-OUT-GND	-

- For other layouts, see installation manual for mass spectrometer module LDS3000.

5 - PLC OUT

Digital outputs

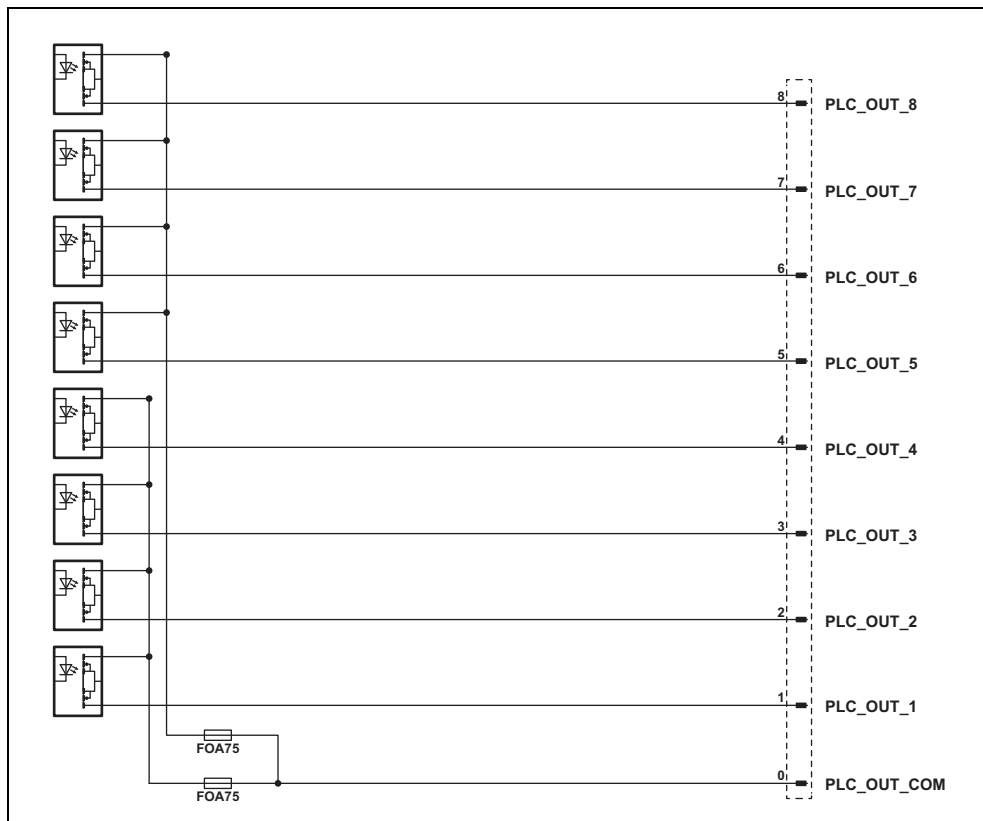


Fig: 4 Digital outputs

Electrical insulation (max. 60 V DC, 25 V AC against GND)

Max. permissible load per output: $U = 30 \text{ V}$, $I = 0.75 \text{ A}$

Fuses for digital outputs 1 ... 4 and 5 ... 8: $2 \times 0.75 \text{ A}$

Connection plug arrangement

The digital outputs can be freely configured.

Pin	Name	Factory setting mass spectrometer module
1	PLC-OUT 1	TRIGGER1 INVERTED
2	PLC-OUT 2	TRIGGER2 INVERTED
3	PLC-OUT 3	TRIGGER3 INVERTED
4	PLC-OUT 4	TRIGGER4 INVERTED
5	PLC-OUT 5	READY
6	PLC-OUT 6	ERROR INVERTED
7	PLC-OUT 7	CAL-REQUEST INVERTED
8	PLC-OUT 8	OPEN
9	PLC-OUT-COM	-

► For other layouts, see installation manual for mass spectrometer module LDS3000.

6 - FUSE and DIP switch S1, S2

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

Fuses for digital outputs 1 ... 4 and 5 ... 8:
2 x 0.75 A (Schurter: 7010.9800.xx)

DIP switch S1	4321
Factory setting (default value of the interface protocol by MS module/control unit)	-000
ASCII protocol	-010
LD protocol	-011
Binary protocol	-101
LDS1000 protocol	-110

1 = ON, 0 = OFF, – = not used

DIP switch S2	4321
Activate boot mode for software update	x+—
Disable bus terminator 120 Ω for RS-485	1x—

1 = ON, + = switching OFF -> ON in operation, – = not used, x = no meaning

7 - LD

Connection for the data cable to the mass spectrometer module

8 - ANALOG IN

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

Connection plug arrangement

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

9 - RS485

Connection for RS-485

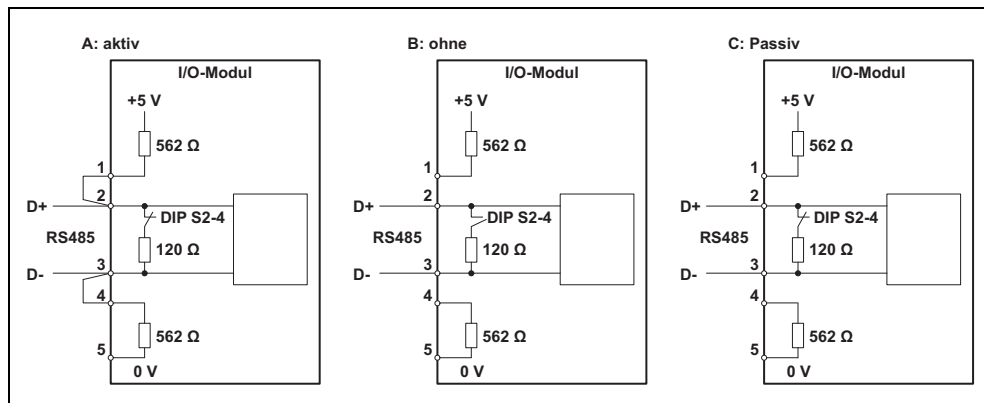


Fig: 5 RS-485 bus terminator

A: Active bus terminator

B: No bus terminator

C: Passive bus terminator

Electrical insulation (max. 60 V DC, 25 V AC against GND)

Connection plug arrangement

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

Information 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.

10 - 24V OUT

24V output

Connection plug arrangement

Pin	Name
+	+24 V
-	GND

Information The I/O module is supplied with voltage by the MS module 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.

4.2 Function

The I/O module is a device interface between the MSB box of the mass spectrometer module LDS3000 and an external controller, for example. The I/O module is equipped with

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

4.3 Technical data

4.3.1 Mechanical data

Dimensions (W x H x D)	107.6 mm x 89.7 mm x 76.6 mm
Weight	300 g

4.3.2 Electrical data

Supply voltage	24 V DC
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4.3.3 Ambient conditions

Permissible ambient temperature (during operation)		10 °C ... 45 °C
Permissible storage temperature		-20 °C ... 60 °C
Max. relative humidity	< +31 °C	80%
	+31 °C to +40 °C	decreasing linearly from 80% ... 50%
	> +40 °C	50%
Type of protection		IP 20
Pollution degree		II
Max. altitude above sea level		2000 m

5 Installation and removal

5.1 Mounting of I/O module

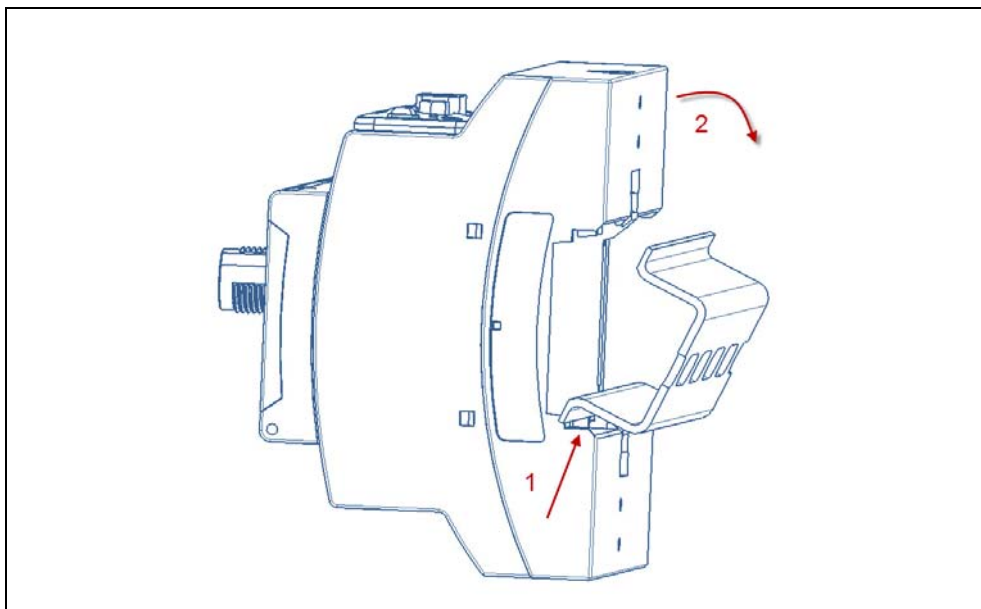


Fig: 6 Mount bus module on DIN-TS35 top hat rail

× DIN-TS35 top hat rail

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

5.1.1 Establish connections

Connecting I/O module with MSB box

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

× Data cables from INFICON

- 1 Connect I/O module (connection LD) via data cable with MSB box (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)

5.2 Removing the I/O module

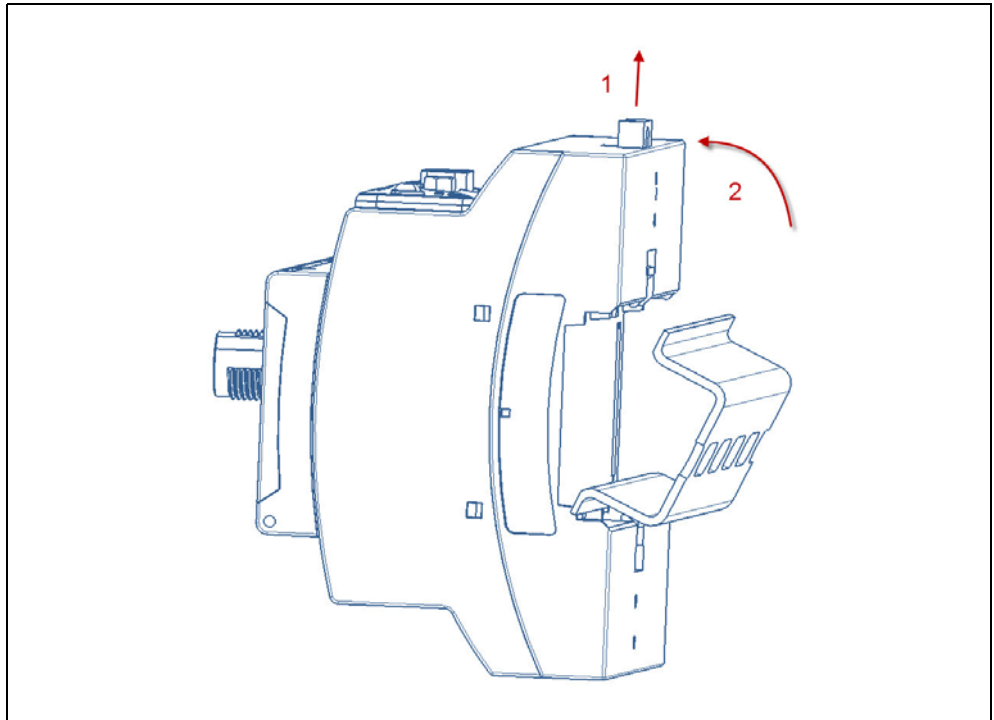


Fig: 7 Removal of the bus module

× Flat-tip screwdriver

- 1 Use the flat-tip screwdriver to pull out the locking device.
- 2 Remove the I/O module from the top hat rail.

6 Disposal

The unit can be disposed of by the user.

Information The unit is made of materials that can be reused. By recycling these materials you reduce waste and environmental impact.

- ▶ For disposal, always comply with local and regional environmental and safety regulations.



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