Inline terminal:
ILT DO 4 AC-1A /
IB IL DO 4 AC-1A-PAC

Device description

SysMik® GmbH Dresden

This manual is intended to provide support for installation and usage of the device. The information is believed to be accurate and reliable. However, SysMik GmbH Dresden assumes no responsibility for possible mistakes and deviations in the technical specifications. SysMik GmbH Dresden reserves the right to make modifications in the interest of technical progress to improve our modules and software or to correct mistakes.

We are grateful to you for criticism and suggestions. Further information (device description, available software) can be found on our homepage www.sysmik.de. Please ask for latest information.

SysMik disclaims all warranties in case of improper use or disassembly and software modifications not described in this document or when using improper or faulty tools. Commissioning and operation of the device by qualified personnel only. All applicable regulations have to be observed.

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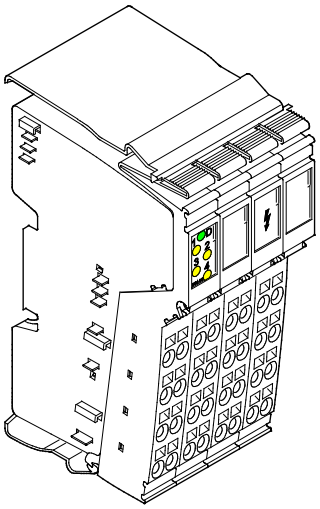
Contents

1 Description

Note: This device description is only valid in association with the IL SYS INST UM user manual.

Make sure you always use the latest documentation – it can be downloaded at www.sysmik.de.



The terminal is designed for use within an Inline station. It is used to output digital output signals in the AC voltage range.

Features

§ Connections for four digital actuators

§ Diagnostic and status indicators

Fig. 1: Terminal with Connectors

ATTENTION: Dangerous voltage! Connecting and disconnecting the terminal is only allowed if the **power supply is disconnected**. When working on the module and wiring, always switch off the supply voltage and ensure it cannot be switched on again. **If these instructions are not followed, there is a danger of damage to health, or even of a life-threatening injury.**

Safety Instructions for Inline Terminals for Installation in Voltage Ranges Outside the SELV (Low Voltage Range)

Only qualified personnel may work on low voltage range Inline terminals.

Qualified personnel are people who, because of their education, experience and instruction, and their knowledge of relevant standards, regulations, accident prevention and service conditions, have been authorized by those responsible for the safety of the plant to carry out any required operations, and who are able to recognize and avoid any possible dangers. (Definitions for skilled workers according to EN 50110-1:1996.)

The instructions given in this device description must be followed during installation and startup.

Technical modifications reserved!

2 Order information

Description	Type	Part number	Pcs./Pkt.
Terminal with four digital outputs for a voltage range from 12 V AC to 253 V AC; incl. add-ons (connector and labeling field)	ILT DO 4 AC-1A	1225-100511-01-3	1
Alternatively ILT terminals can be replaced by IB IL terminals:	IB IL DO 4 AC-1A-PAC	2861658	1

3 Technical data

General data	
Housing dimansions (width x height x depth)	48.8 mm x 120 mm x 66,6 mm (1.921 in. x 4.724 in. x 2.622 in.)
Weight	130 g (without connectors)
Operating mode	Process data operation with 4 Bits
Connection method (actors)	3-wire
Permissible temperature (operation)	-25 °C to +55 °C (-13 °F to +13 °F)
Permissible temperature (storage/transport)	-25 °C to +85 °C (-13 °F to +185 °F)
Permissible humidity (operation/storage/transport)	75 % on average, 85 % occasionally
Note: In the range from -25 °C to +55 °C (-13 °F to +131 °F) appropriate measures against increased humidity (> 85 %) must be taken. **Note:** For a short period, slight condensation may appear on the outside of the housing if, for example, the terminal is brought into a closed room from a vehicle.	
Permissible air pressure (operation)	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
Permissible air pressure (storage/transport)	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 20 according to IEC 60529

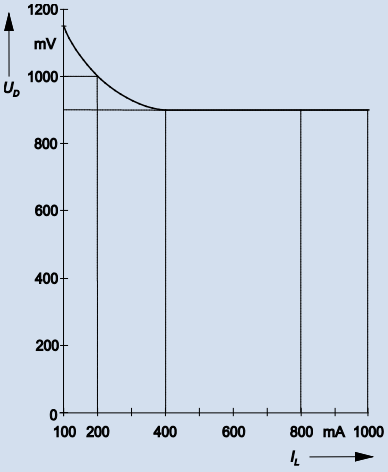
Interface	
Local bus	Through data routing

Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	45 mA, max.
Power consumption from the local bus	0.34 W, max.
Power consumption on the I/O supply voltage	4.0 W, max.
Total power consumption	4.34 W, max.

Supply of the module electronics through the bus terminal and of the I/O through the power terminal	
Connection method	Through potential routing

Digital outputs	
Number	4
Output type	Triac output with zero voltage switch
Nominal output voltage U_{OUT}	12 V AC ≤ U_{OUT} ≤ 253 V AC, 50 Hz to 60 Hz
Maximum differential voltage for Inom	1,5 V
Nominal current Inom	1 A
Maximum permissible current	Observe derating! (see derating, page 7)
I2t value (one half wave) for short-circuit protection	120 A²s
Protection	No integrated protection against short-circuit and overload
Behavior in the event of an error without external protection	Output is damaged
Note: Short-circuit protection can be achieved by means of a pre-connected fuse with an appropriate fusible element.	
Signal delay	One half wave, maximum
Starting torque of the output	At voltage zero
Triac	600 V
Maximum coefficient ΔI/Δt	20 A/µs
Switching frequency	Network frequency, maximum, depending on bus length, data rate, and ambient conditions
Nominal load (ohmic)	12 W ≤ P_N ≤ 230 W
Total current	4 A
Minimum holding current	100 mA at 0 °C (32 °F)< TA ≤ 55 °C (131 °F) 200 mA at -25 °C (-13 °F) < TA < 0 °C (32 °F) (incl. snubber element)
Type of protective circuit	RC snubber element 47 nF/100 Ω
Note: When the output is switched off (off), it is not electrically isolated due to the RC protective circuit (see Fig.3, pg.7).	

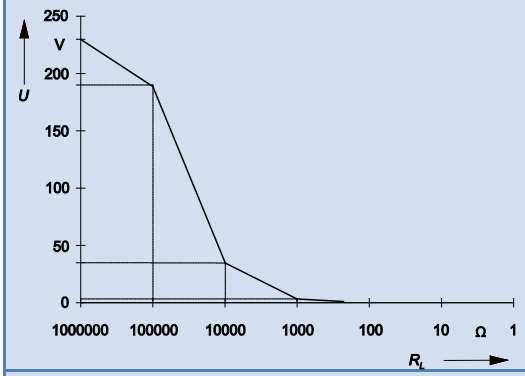
Output characteristic when switched ON (typical)



Output current (Load current) (A)	Differential output voltage (V)	Power dissipation (mW)
0	0	0
0,1	1,15	0,12
0,2	1,00	0,20
0,4	0,90	0,36
0,6	0,90	0,54
0,8	0,90	0,72
1,0	0,90	0,90

Bild 2: Typical differential output voltage when switched on (U_D [mV]) as a function of the load current (I_L [mA])

Output characteristic when switched OFF at 230 V



Load resistance (Ω)	Output voltage (V) at 50 Hz	Output voltage (V) at60 Hz
1 000 000	230	230
100 000	190	200
10 000	35	40
1 000	3,5	4
230	1	1

Bild 3: Typical output voltage when switched off U [V] (at 50 Hz) as a function of the load resistance R_L [Ω]

Power dissipation

Formula to calculate the power dissipation of the electronics

$$P_{EL} = 0{,}340\ W + \sum_{n=1}^{4} [\, I_{Ln} \times 1\ V]$$

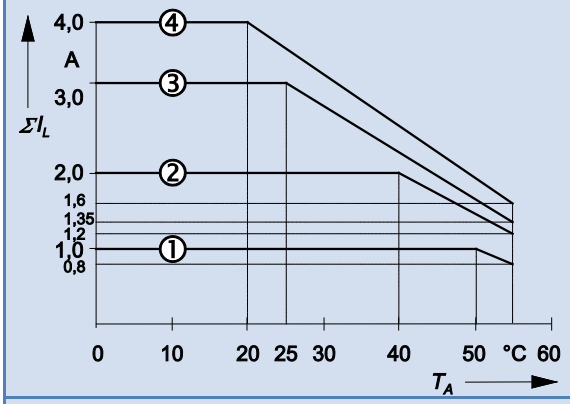
Dabei sind:

P_{EL} Total power dissipation of the terminal

n Index of the number of set outputs n = 1 bis 4

I_{Ln} Load current of the output n

Limitation oft simultaneity, Derating



Meaning oft the curves:

1 One output set

2 Two outputs set simultaneously (50 % simultaneity)

3 three outputs set simultaneously (75 % simultaneity)

4 Four outputs set simultaneously (100 % simultaneity)

Bild 4: Derating: Permissible total load current ΣI_L [A] depending on the number of simultaneously set outputs and the ambient temperature T_A [°C]

Safety devices

Surge voltage	275 V varistor

Electrical isolation / Isolation of the voltage areas	
Common isolated groups	
Phase and PEN conductor have the same potential. PE is a separate potential area.	
Separate system potentials consisting of bus terminal/power terminal in the 24 V DC area and supply terminals/I/O terminals in the AC area	
Test distance	**Test voltage**
5 V supply incoming remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
5 V supply outgoing remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
7.5 V supply (bus logic) / I/O area	2500 V AC, 50 Hz, 1 min.
Routine test	1200 V AC, 50 Hz, 1 min.
I/O area AC / PE	2500 V AC, 50 Hz, 1 min.
Output / phase	500 V AC, 50 Hz, 1 min.

Error messages to the higher level control or computer system	
Short-circuit of the digital output	No
Overload of the digital output	No

4 Local diagnostic and status indicators and terminal point assignment

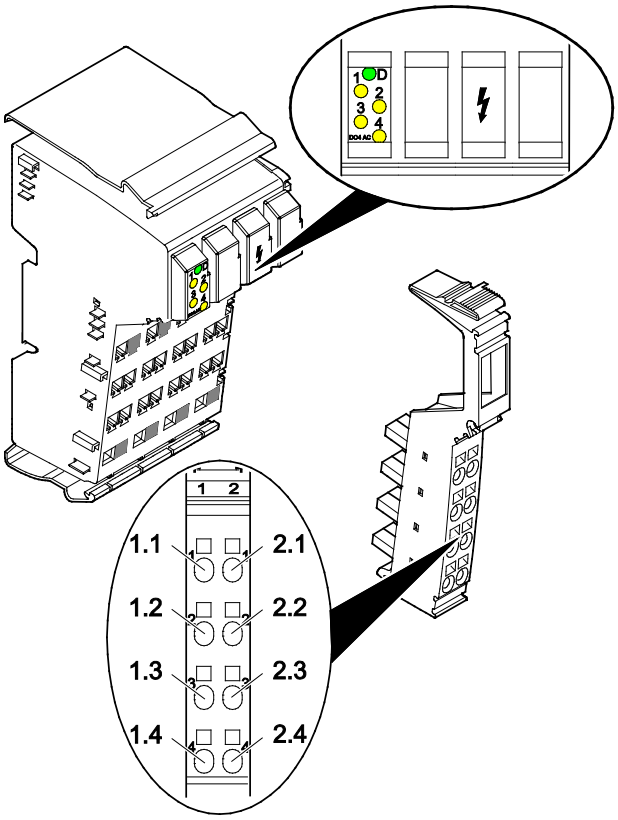


Fig. 5: Local status and diagnostic indicators; terminal assignment

Local diagnostic and status indicators

Des.	Color	Meaning
D	green	Diagnostic
1, 2, 3, 4	yellow	Output status

Terminal point assignment

Terminal point	assignment
1.1	Not used
1.2	Digital output
1.3	PEN conductor connection (N)
1.4	Protective earth conductor connection (PE)
2.1, 2.2, 2.3, 2.4	Not used

Functional identification:
Dark red with lightning bolt

5 Internal circuit

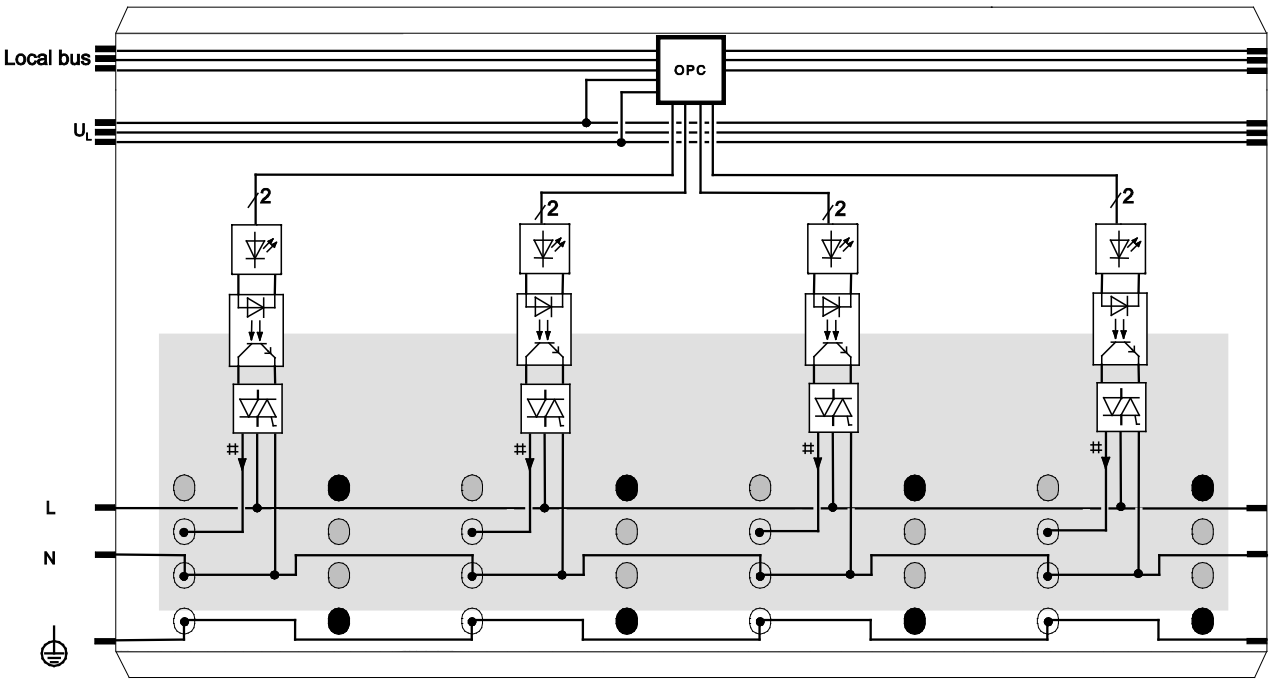


Fig. 6: Internal wiring of terminal points

Key:

OPC	Protocol chip (bus logic including voltage conditioning)	#	Digital output
	LED		Isolated area
	Optocoupler		Terminal point, without metal contact
	Triac		Terminal point, without metal contact, with filler plugs

Note: Explanation for other used symbols is provided in the IL SYS INST UM E manual.

6 General installation instructions

Installing the system

Note: Install the system according tot he requirements of EN 50178!

Starting up an Inline station

An Inline station can only be started up if it has been properly installed. This means:

§ all terminals must be installed with their connectors

§ the station must be terminated with the end plate and the two end clamps.

Avoiding malfunctions:

The AC terminal must **only** be connected to the Inline station through an appropriate INLINE power terminal! The voltage should only be switched on when the AC area has been terminated with the end terminal and all the connectors are connected.

The special features of the AC and 24 V DC terminals and connectors are listed in the user manual and in the data sheets for the power terminals for AC areas.

7 Installation instructions for a low voltage area (AC area)

Dangerous voltage!

Please note that there are dangerous voltages when working on circuits that do not meet SELV requirements.

Connecting and disconnecting terminals for the AC area is only allowed if the power supply is disconnected.

When working on terminals and wiring, always switch off the supply voltage and -ensure it cannot be switched on again.

Please use grounded AC networks!

Inline terminals for the AC voltage area should only be operated in grounded AC networks.

Structure of an AC area

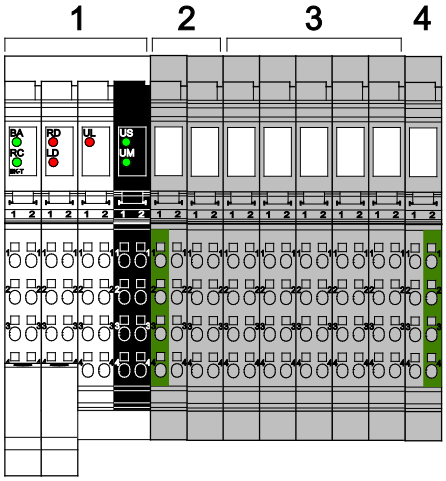


Fig. 7: Example of an Inline AC area

An AC area **must** have an AC power terminal at one end and an AC end terminal at the other.

I/O terminals that are suitable for this area can be used between these terminals. They are limited in number by the Inline system restrictions (see IB IL SYS PRO UM E User Manual).

Key:

1	Bus terminal
2	AC power terminal
3	Various I/O terminals
4	AC end terminal

Fusing an AC Area

Each AC area must be protected with its own fuse.

Please note that the fuse required depends on the specific application.

Connecting the Supply and the I/O in the AC Area

Multiple supplies are not –permitted! The supply voltage must **only** be provided for the appropriate power.

The connecting cables of all actuators and sensors should only be connected to the -Inline AC terminals. The use of external bus bars for group voltages is **not permitted**.

Interrupting PE Jumpering in the AC Area

The PE jumper begins at the power terminal of the AC area and, in a complete AC area, ends at the end terminal.

If a terminal is removed from this area, the PE jumper is interrupted.

If the installation instructions have been followed, all subsequent terminals will be disconnected.

8 Connection example

Observe the current carrying capacity!

The maximum total current flowing through the potential jumpers is 8 A.

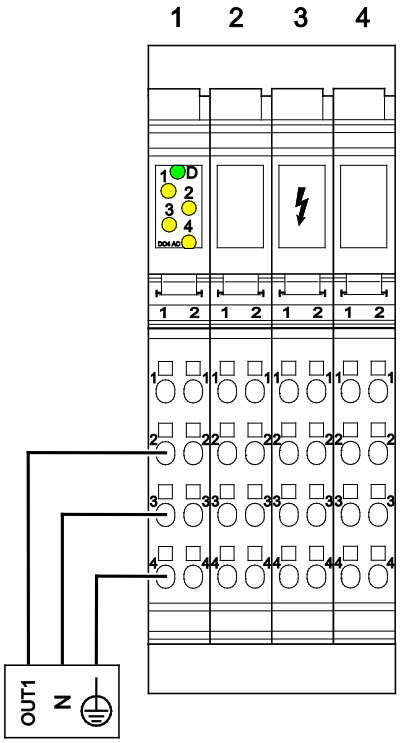


Fig. 8: Connecting an actuator (sample)

The numbers above the module display indicate the mounting locations of the connectors.