Inline Terminal: 230 V AC digital input
ILT 230 DI 1
IB IL 230 DI 1-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.

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Content

1 Description

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 danger of damage to health, or even of a life-threatening injury.

The terminal is designed for use within an Inline station. It is used to detect digital input signals in a 230-V-AC voltage area

Features

- Connections for one digital sensor
- Maximum permissible load current 500 mA
- Diagnostic and status indicators

2 Order Information

Description	Type	Order No.	Pcs./Pkt
Terminal with one (1) digital input (in a 230 V AC area)	ILT 230 DI 1	1225-100497-01-0	1
Alternatively usable terminal:	IB IL 230 DI 1-PAC	2861548	1

3 Technical Data

General Data	
Housing dimensions (width x height x depth)	12,2 mm x 120 mm x 66,6 mm [0.48 ″ x 4.724 ″ x 2.622 ″]
Weight	39 g (without connector)
Operating mode	Process data operation with 2 bits
Sensor connection type	3-wire
Permissible temperature (operation)	-25 °C to +55 °C [-13°F to +131°F]
Permissible temperature (storage/transport)	-25 °C bis +85 °C [-13°F to +131°F]
Permissible humidity (operation)	75 % on average, 85 % occasionally

In the range from -25 °C to +55 °C [-13 °F to +131 °F] appropriate measures against increased humidity (> 85%) must be taken.

Permissible humidity (storage/transport)	75 % on average, 85 % occasionally

For a short period, slight condensation may appear on 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

Supply of the Module Electronics Through the Bus Terminal and of the I/O Through the Power - Terminal	
Connection method	Through potential routing

Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	30 mA, maximum
Power consumption from the local bus	0.23 W, maximum
I/O supply voltage	230 V AC (nominal value)
Nominal current consumption on the I/O supply voltage	Depends on the sensor

Digital Input	
Number	1
Input features	According to EN 61131-2 Typ 1
Definition of switching thresholds	
Signal 0	0 V AC ≤ U_{IN} ≤ 40 V AC
Signal 1	164 V AC ≤ U_{IN} ≤ 253 V AC
Nominal input voltage UIN	230 V AC
Permissible range	12 V AC ≤ U_{IN} ≤ 253 V AC
Nominal input current for UIN	6,11 mA at 230 V AC, 60 Hz
Total current	Depends on the sensor
Delay time	T_{ON} 40 ms typical / T_{OFF} 10 ms typical
Permissible cable length to the sensor	30 m [98.425 ft.]
Protection	No integrated protection against short circuit and overload
Behavior in the event of an error (short circuit)	Protective element in the power terminal is damaged
	Short circuit protection can be achieved by means of a pre-connected fuse with an appropriate fusible element.
Switching frequency	Maximum network frequency, depending on bus length, data rate, and ambient conditions

Input Characteristic Curve

Frequency (Hz)	Input Voltage (V)	Typical Input Current (mA)	Active Power Loss (mW)
50	30	1,07	204
50	60	2,25	218
50	90	3,28	241
50	120	4,10	273
50	150	4,76	314
50	180	5,29	365
50	210	5,76	424
50	240	6,11	493

Power Dissipation

Formula to calculate the power dissipation oft the electronics $P_{EL} = 0.23\ W + \left(\frac{U_{IN}}{Z}\right)^2 \times 100\ \Omega + \frac{U_{IN}^2}{200\,000\ \Omega}$	wehre are: P_{EL} Total power dissipation oft the terminal Z Resistance (Z = 33 863 Ω (50 Hz)) U_{IN} Input voltage oft the input
Power dissipation oft the housing P_{HOU}	0,7 W (within the permissible operation temperature)

Concurent Channel Derating

None

Safety Devices

Overload/short circuit in phase L	Using external fuse
Surge voltage	Protective circuits of the power terminal

Electrical Isolation/Isolation of the Voltage Areas
Common Isolated Groups
Phase and neutral conductor have the same potential. PE is a separate potential area.
Separate Potentials in the System 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 Tested	2500 V AC, 50 Hz, 1 min 1200 V AC, 50 Hz, 1 min
I/O area / PE	500 V AC, 50 Hz, 1 min
Input / phase	500 V AC, 50 Hz, 1 min

Air and Creepage Distances (according to EN 50178, VDE 0109, VDE 0110)			
Isolating Distance	**Air Distance**	**Creepage Distance**	**Impulse Voltage Withstand Level**
Technology for 230 V AC area single phase (up to 253 V AC) safe isolation according to EN 50178			
Bus logic / I/O devices	5,5 mm [0.217 ″]	5,5 mm [0.217 ″]	4 kV
I/O devices / PE	3,2 mm [0.126 ″]	3,2 mm [0.126 ″]	4 kV

Error Messages to the Higher-Level Control or Computer System
None

4 Local Diagnostic and Status Indicators / Terminal Point Assignment

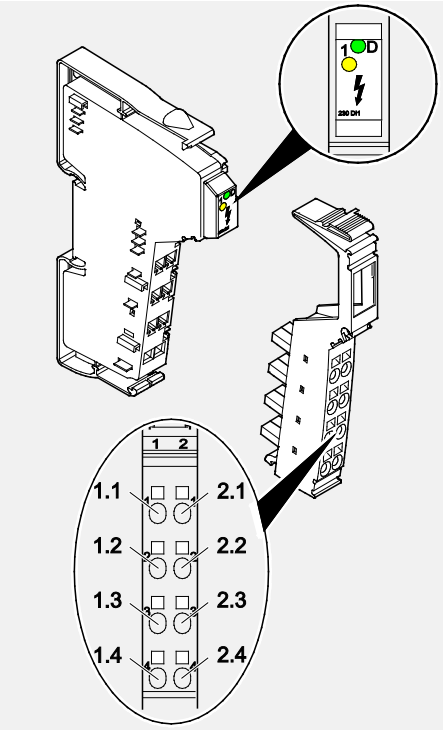


Fig. 1: Terminal with appropriat connector

Designation	Color	Meaning
D	green	Bus diagnostics
1	yellow	Input status
Function identification		Cobalt blue with lightnig bolt
Housing / Connector color		Gray housing / gray connector – coded according to function
Terminal point assignmet:		
Terminal point		**Assignment**
1.1		Not used
1.2		Digital input
1.3		Connection of phase L
1.4		Neutral conductor connection (N)
2.1, 2.2, 2.3, 2.4		Not used

5 Internal Circuit Diagram

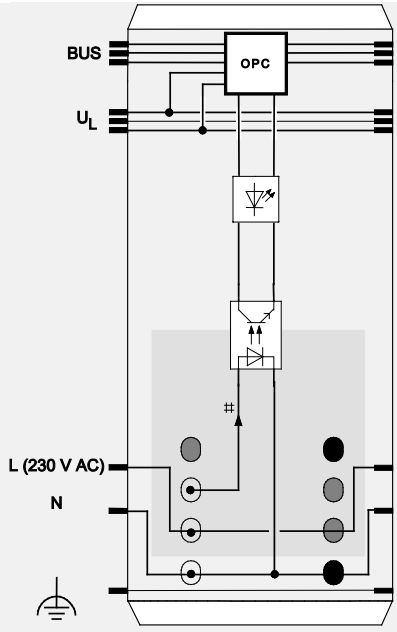


Fig. 2: Internal wiring oft terminal points

Key			
OPC	protocol chip (bus logic including voltage condition-ing)		Isolated area
	LED		Terminal point without metal con-tact
	Optocoupler		Terminal point without metal con-tact with filler plugs
	Digital input		Other symbols are explained in the user manual: IB IL SYS PRO UM

6 General Installation Instructions and Notes

Installing the System

Install the system according to he requirements of EN 50178!

Satrting Up an Inline-Station

An Inline station ought to be operated only when it is completely installed. This means:

- All terminals mus be equipped with their connectors
- The station must be terminated with the end plate and the two end clamps

Avoicing malfunctions

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

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

7 Installation Instructions and Notes for an 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 voltage 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.

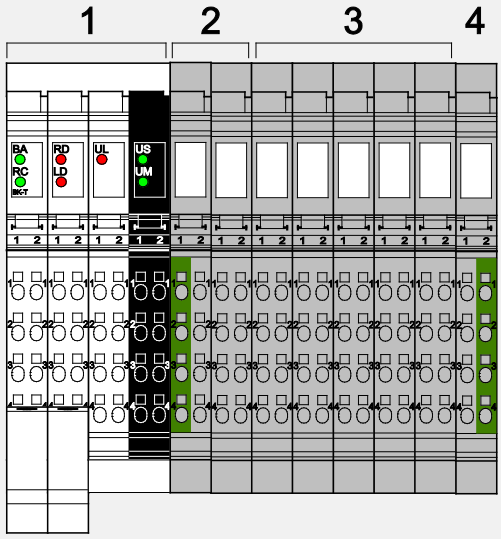
Please use grounded AC networks!

Inline terminals for the AC voltage area ought to be operated in grounded AC networks.

Structure of an 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. The number is limited by the system restrictions of the Inline station and the entire bus system (see IB IL SYS PRO UM user manual).



1 Bus terminal

2 AC power terminal

3 Various AC input / output terminals

4 AC end terminal

Fig. 3: typical Inline AC area

Fusing an AC Area

Protect each AC area using an intrinsically safe 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 supplied to the power terminal for which it is meant.

The connecting cables of all actuators and sensors ought to 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.

As long as the installation instructions are followed, all subsequent terminals will be disconnected.

8 Connection Notes and Example

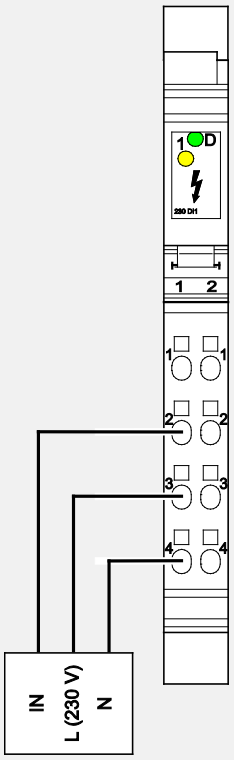


Fig. 4: typical sensor connections

Observe the current carrying capacity!
The maximum total current flowing through the potential jumpers is 8 A.

Programming Data

ID code	BE_{hex} (190_{dez})
Length code	$C2_{hex}$
Process data channel	2 Bit
Input address area	2 Bit
Output address area	0 Bit
Parameter channel (PCP)	0 Bit
Register length (bus)	2 Bit