Inline Terminal: digital input
ILT 120 DI 1

Device Description

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.

SysMik GmbH Dresden	**Tel**	**+ 49 (0) 351 – 4 33 58 – 0**
Bertolt-Brecht-Allee 24	**Fax**	**+ 49 (0) 351 – 4 33 58 – 29**
01309 Dresden	**E-Mail (Sale)**	**sales@sysmik.de**
	E-Mail (Support)	**service@sysmik.de**
Germany	**Homepage**	**www.sysmik.de**

Content

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.

Dangerous Voltage: Connecting and disconnecting the terminal is only allowed if the power supply is disconnected. When working on the terminal 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 lifethreatening injury.**

Safety Instructions for Inline Terminals for Installation in -Areas Outside the SELV (-Low Voltage Area)

Only qualified personnel may work on low voltage area 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 data sheet must be followed during installation and startup.

Technical modifications reserved.

The terminal is designed for use within an Inline station. This terminal is used to detect digital input signals in the 120 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-Nr.	Pcs./Pkt.
Termina with one (1) digital input; complete with accessories (connectors and labeling fields)	ILT 120 DI 1	1225-100543-01-4	1

3 Technical Data

General data	
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 66.6 mm (0.480 ‘‘ x 4.724 ‘‘ x 2.622 ‘‘)
Weight	39 g (without connector)
Operating mode	Process data operation with 2 Bit
Sensor connection type	3-wire
Permissible temperature (operation)	-25 °C to +55 °C (-13 °F to +131 °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
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	IP20 according to IEC 60529
⚠	In the range from -25 °C to +55 °C (-13 °F to +131 °F) appropriate measures against increased humidity (> 85 %) must be taken. 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.

Interface	
Local bus	Through data routing

Supply of the module electronics through bus terminal and of the I/O through 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 U_S	120 V AC (nominal value)
Nominal current consumption on the I/O -supply voltage U_S	Depends on sensor

Digital input	
Number	1
Input features	According to EN 61131-2 Type 1
Definition of switching thresholds	
- Signal 0	0 V AC ≤ U_{IN} ≤ 40 V AC
- Signal 1	77 V AC ≤ U_{IN} ≤ 135 V AC
Nominal input voltage U_{IN}	120 V AC
Permissible range	108 V AC ≤ U_{IN} ≤ 135 V AC
Nominal input current for U_{IN}	8.1 mA at 120 V AC, 60 Hz
Total current	Depends on sensor
Characteristic curve of the current	linear in an area of 1 V < U_{IN} < 135 V
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)**
60	30	2.55	213
60	60	4.54	254
60	90	6.46	321
60	120	8.10	416
60	150	9.46	537

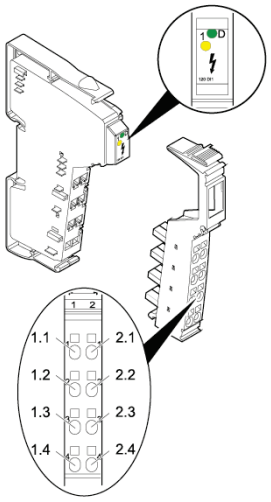
Power dissipation	
Formula to calculate the power dissipation of the electronics	$P_{EL} = 0.23\ W + (\frac{U_{IN}}{Z})^2 \times 100\ \Omega + \frac{U_{IN}^2}{68000\ \Omega}$
Dabei sind P_{EL} total power dissipation of the terminal Z Reactance (Z = 18813 Ω 60 Hz)) U_{IN} input voltage of the input	
Power dissipation of the housing P_{HOU}	7 W (within the permissible operating temperature)

Concurrent channel, Derating	None

Safety Devices	
Overload/short circuit in phase L	Overload/short circuit in phase L
Surge voltage	Surge voltage

Electrical Isolation/Isolation of the Voltage Areas	
	**Note:** To achieve electrical isolation between the logic level and the I/O area, supply these areas from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted (see also application description)!
Common Isolated Groups	
Phase and neutral 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/PE	500 V AC, 50 Hz, 1 min.
Input/phase	500 V AC, 50 Hz, 1 min.

4 Local Diagnostic and Status Indicators / Terminal Point Assignment



Function identification: Cobalt blue with lightnig symbol

Housing-/connector colour: Gray

Local diagnostic and status indicators:

Designation	Colour	Meaning
D	Green	Diagnostics
1	Yellow	Input status indication

Terminal point assignment:

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

Fig. 1: Terminal with appropriate connector

5 Internal Circuit Diagram

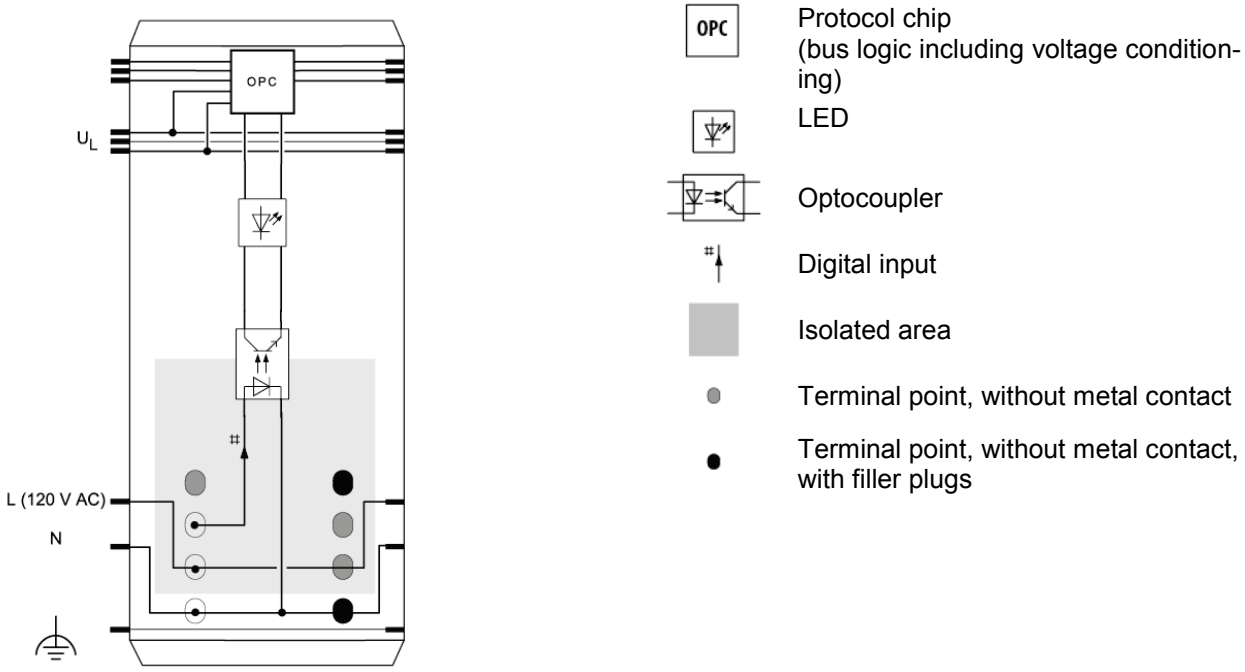


Fig. 2: Internal wiring of the terminal points

Note: Other symbols are explained in the user manual IL SYS INST UM.

6 General Installation Instructions

Installing the system:

Install the system according to the 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 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 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 these 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.

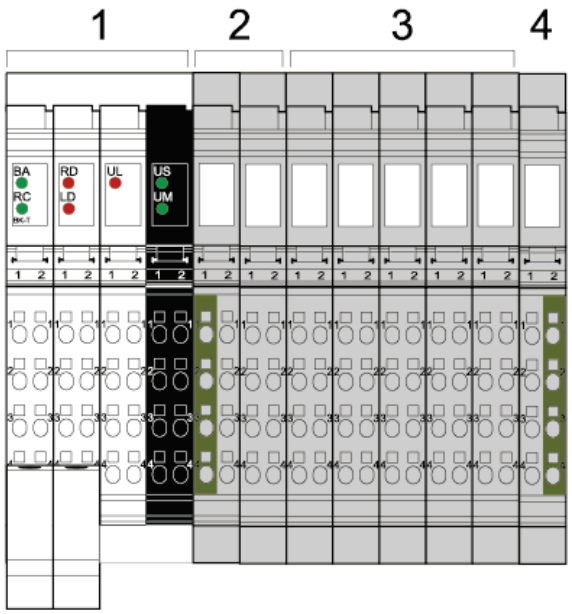
Use grounded AC networks!

Inline terminals for the AC voltage area should only 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 system (see IL SYS PRO UM).



1 Bus terminal
2 AC power terminal
3 Various AC input/output terminals
4 AC end terminal

Fig. 3: Example of an 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 should only be connected to the Inline AC terminals. The use of external bus bars for group voltages is **not permitted**.

Interrupting the 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 Example

Observe the current carrying capacity!

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

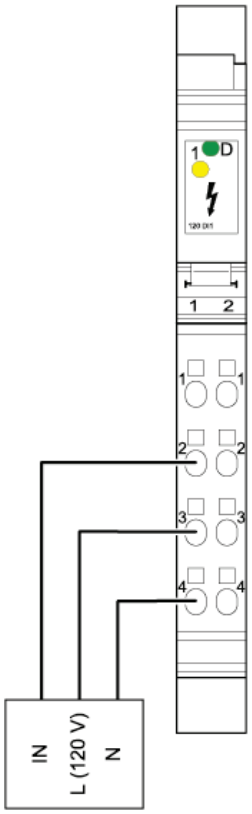


Fig. 4: Typical sensor connection