



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



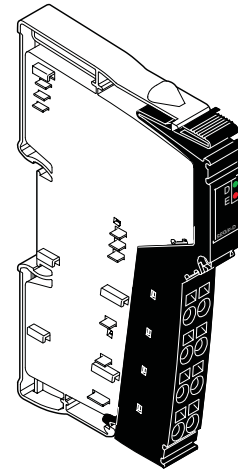
# IB IL 24 SEG/F-D ...

## Inline Segment Terminal With Fuse and Diagnostics

### AUTOMATIONWORX

Data Sheet  
5658\_en\_03

© PHOENIX CONTACT - 01/2007



### Description

The terminal is designed for use within an Inline station.

The segment terminal is used to create a protected partial circuit (segment circuit) within the main circuit.

The terminal is not used to supply power and has no elements for protection against polarity reversal and surge voltage.

This terminal has an LED for diagnostics and occupies two input data bits, which are used to indicate the presence of the supply voltage and the state of the fuse.

### Features

- Automatic creation of a segment circuit within the main circuit
- Segment circuit protected by an internal fuse
- Diagnostic indicators
- Mapping of the status of the internal fuse and the main voltage to the input data



This data sheet is only valid in association with the IB IL SYS PRO UM E user manual or the Inline system manual for your bus system.



Make sure you always use the latest documentation.  
It can be downloaded at [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).  
A conversion table is available on the Internet at  
[www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://www.download.phoenixcontact.com/general/7000_en_00.pdf).



This data sheet is valid for all products listed on the following page:

## Ordering Data

### Products

Description	Type	Order No.	Pcs./Pck.
Inline Segment terminal with fuse and diagnostics; without accessories transmission speed of 500 kbps	IB IL 24 SEG/F-D	2836683	1
Inline Segment terminal with fuse and diagnostics; complete with accessories (connector and labeling field); transmission speed of 500 kbps	IB IL 24 SEG/F-D-PAC	2861904	1
Inline Segment terminal with fuse and diagnostics; without accessories transmission speed of 2 Mbps	IB IL 24 SEG/F-D-2MBD	2855033	1
Inline Segment terminal with fuse and diagnostics; complete with accessories (connector and labeling field); transmission speed of 2 Mbps	IB IL 24 SEG/F-D-2MBD-PAC	2861946	1



One of the connectors listed below is needed for the complete fitting of the IB IL 24 SEG/F-D and IB IL 24 SEG/F-D-2MBD terminals.

### Accessories

Description	Type	Order No.	Pcs./Pkt
Connector (black, w/o color print)	IB IL SCN-PWR IN	2727462	10
Connector (black, with color print)	IB IL SCN-PWR IN-CP	2727637	10
Fuse	SI 5 x20 6,300 A T	5030512	10

### Documentation

Description	Type	Order No.	Pcs./Pkt
"Configuring and Installing the INTERBUS Inline Product Range" user manual	IB IL SYS PRO UM E	2743048	1
"Automation Terminals of the Inline Product Range" user manual	IL SYS INST UM E	2698737	1

## Technical Data

### General Data

Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm
Weight	44 g, approximately (without connector), 59 g, approximately (with connector)
Operating mode	Process data mode with 2 bits
Ambient temperature (operation)	-25°C to +55°C
Ambient temperature (storage/transport)	-25°C to +85°C
Permissible humidity (operation/storage/transport)	10% to 95%, according to DIN EN 61131-2
Air pressure (operation/storage/transport)	70 kPa to 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20 according to IEC 60529
Protection class	Class 3 according to VDE 0106, IEC 60536
Connection data for Inline connector	
Connection method	Spring-cage terminals
Conductor cross section	0.2 mm <sup>2</sup> to 1.5 mm <sup>2</sup> (solid or stranded), 24 - 16 AWG

### Interface

Local bus	Through data routing
-----------	----------------------

**Transmission Speed**

IB IL 24 SEG/F-D	500 kbps
IB IL 24 SEG/F-D-PAC	500 kbps
IB IL 24 SEG/F-D-2MBD	2 Mbps
IB IL 24 SEG/F-D-2MBD-PAC	2 Mbps

**Power Consumption**

	500 kbps	2 Mbps
Communications power $U_L$	7.5 V DC	7.5 V DC
Current consumption at $U_L$	25 mA, maximum	45 mA, maximum
Power consumption at $U_L$	0.19 W, maximum	0.34 W, maximum
Main voltage $U_M$	24 V DC (nominal value)	24 V DC (nominal value)
Nominal current consumption at $U_M$	4.0 A (nominal value)	4.0 A (nominal value)

**Supply of the Module Electronics and the I/O Through the Bus Coupler/Power Terminal ( $U_L$ ,  $U_M$ )**

Connection method Through potential routing

**24 V I/O Supply ( $U_M$ ,  $U_S$ )**

The main voltage  $U_M$  is supplied at the bus coupler or at a power terminal. The segment voltage  $U_S$  is provided automatically at this segment terminal and protected by the internal fuse.

Connections for a supply voltage are not provided on the segment terminal. The terminal points are **only** provided for measuring purposes.

**Permissible Total Current in the Potential Jumpers of the Main and Segment Circuit/Nominal Current of the Terminal**

	500 kbps	2 Mbps
Permissible total current in the potential jumpers	6.3 A	5.4 A
Nominal current of the terminal	4.0 A	4.0 A
Tolerance	+10%	+10%



The terminal is supplied with a 6.3 A slow-blow fuse.

**Power Dissipation**

**Formula to Calculate the Power Dissipation of the Electronics (500 kbps)**

$$P_{TOT} = 0.180 \text{ W} + I_L^2 \times R_F$$

Where

$P_{TOT}$  Total power dissipation in the terminal

$I_L$  Load current in the segment circuit

$R_F$  Resistance of the fuse

The resistance of the fuse  $R_F$  for a 6.3 AT fuse is approximately 12 m $\Omega$ .

The power dissipation of the electronics for a theoretical maximum current of 6.3 A (nominal current = 4.0 A) is calculated as follows:

$$P_{TOT} = 0.18 \text{ W} + 39.69 \text{ A}^2 \times 0.012 \Omega = 0.66 \text{ W}$$

**Formula to Calculate the Power Dissipation of the Electronics (2 Mbps)**

$$P_{TOT} = 0.34 \text{ W} + I_L^2 \times R_F$$

Where

$P_{TOT}$  Total power dissipation in the terminal

$I_L$  Load current in the segment circuit

$R_F$  Resistance of the fuse

The resistance of the fuse  $R_F$  for a 6.3 AT fuse is approximately 12 m $\Omega$ .

The power dissipation of the electronics for a theoretical maximum current of 5.4 A (nominal current = 4.0 A) is calculated as follows:

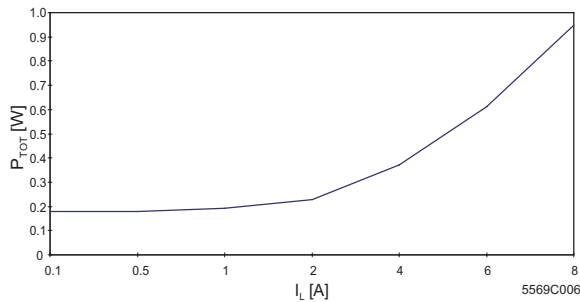
$$P_{TOT} = 0.34 \text{ W} + 29.16 \text{ A}^2 \times 0.012 \Omega = 0.68 \text{ W}$$

**Power Dissipation of the Housing ( $P_{HOU}$ ) (500 kbps and 2 Mbps)**

$P_{HOU} = 0.7 \text{ W}$  in the total permissible ambient temperature range

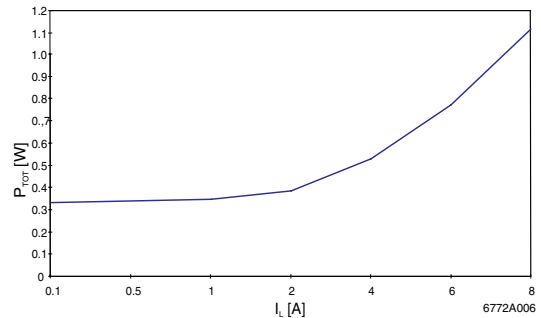
**Typical Power Dissipation of the Electronics Depending on the Load Current in the Segment Circuit**

**500 kbps**



$P$  [W] Power dissipation in W  
 $I_L$  [A] Load current in the segment circuit in A  
 This test was carried out with a 6.3 AT fuse.

**2 Mbps**



$P$  [W] Power dissipation in W  
 $I_L$  [A] Load current in the segment circuit in A  
 This test was carried out with a 6.3 AT fuse.

**Derating of the Load Current in the Segment Circuit**

No derating

**Safeguards**

Overload/short circuit in the segment circuit

Fuse 5 x 20 with 6.3 A slow-blow



Fuses with other values can also be used. The maximum fuse value must not exceed 6.3 A.



**Note for the selection of fuses:**  
 For fuses with a value greater than 2 A, only slow-blow fuses may be used.

Surge voltage

Protection against polarity reversal

Protective elements in the power terminal or the bus coupler

Protective elements in the power terminal or the bus coupler

**Electrical Isolation/Isolation of the Voltage Areas**



To provide electrical isolation between the logic level and the I/O area, it is necessary to supply these areas via the bus coupler or via the bus coupler and a power terminal from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted. Please also observe the GND/PE connections on the power supply units (see also user manual).

**Common Potentials**

The 24 V main voltage, 24 V segment voltage, and GND have the same potential. FE is a separate potential area.

**Separate Potentials in the System Consisting of Bus Coupler/Power Terminal and I/O Terminal**

**- Test Distance**

5 V supply incoming remote bus/7.5 V supply (bus logic)

5 V supply outgoing remote bus/7.5 V supply (bus logic)

7.5 V supply (bus logic)/24 V supply (I/O)

24 V supply (I/O)/functional earth ground

**- Test Voltage**

500 V AC, 50 Hz, 1 min.

500 V AC, 50 Hz, 1 min.

500 V AC, 50 Hz, 1 min.

500 V AC, 50 Hz, 1 min.

**Error Messages to the Higher-Level Control or Computer System**

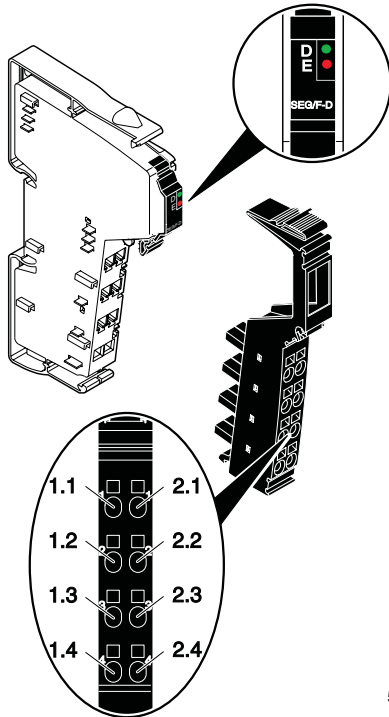
I/O error message if fuse has blown or is missing

I/O error message if supply voltage  $U_M$  is not present

**Approvals**

For the latest approvals, please visit [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).

## Local Diagnostic and Status Indicators and Terminal Point Assignment



5658B003

Figure 1 Terminal with appropriate connector

### Local Diagnostic Indicators

Des.	Color	Meaning
<b>D</b>	<b>Green</b>	<b>Diagnostics</b>
	ON:	Bus active
	Flashing:	
	0.5 Hz:	Communications power present, Bus not active
	2 Hz:	Communications power present, supply voltage $U_M$ not present or fuse has blown.
4 Hz:	Communications power present, local bus error	
OFF:	Communications power not present, Bus not active	
<b>E</b>	<b>Red</b>	<b>Fuse in segment circuit <math>U_S</math></b>
	OFF:	Fuse OK
	ON:	Fuse has blown



If supply voltage  $U_M$  is not present and the fuse has blown or is missing, an I/O error message is generated on the higher-level control or computer system.



A blown or missing fuse is indicated by both diagnostic indicators. The red E LED lights up and the green D LED flashes at 2 Hz.

### Function Identification

Black

2 Mbps: white stripe in the vicinity of the LED D

### Terminal Point Assignment

Terminal Point	Assignment
1.1, 2.1	Segment voltage $U_S$ (after the fuse)
1.2, 2.2	Main voltage $U_M$
1.3, 2.3	GND of the supply voltages
1.4, 2.4	Functional earth ground (FE)



The terminal points are **only** provided for measuring purposes.

## Internal Circuit Diagram

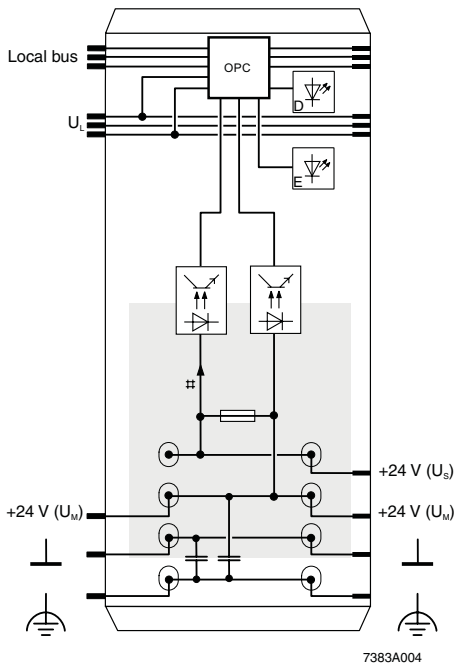








Figure 2 Internal wiring of the terminal points

Key:

-  Protocol chip  
(bus logic including voltage conditioning)
-  LED with details of the indicator designation  
"D" or "E" (see page 5)
-  Optocoupler
-  Fuse
-  Capacitive connection to functional earth  
ground (FE)
-  Electrically isolated area



Other symbols used are explained in the IB IL SYS PRO UM E user manual or the system manual for your bus system.

## Programming Data

### Local Bus (INTERBUS)

ID code	BE <sub>hex</sub> (190 <sub>dec</sub> )
Length code	C2 <sub>hex</sub>
Process data channel	2 bits
Input address area	2 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

### Other Bus Systems



For the programming data/configuration data of other bus systems, please refer to the corresponding electronic device data sheet (e.g., GSD, EDS).

## Process Data

### Assignment of IN Process Data



The IN process data only maps the status of the fuse and the main voltage.

(Byte.bit) view		0.1	0.0
Assignment	Main voltage $U_M$ present, fuse OK	1	1
	Main voltage $U_M$ present, fuse blown or missing	1	0
	Main voltage $U_M$ not present	0	0



For the assignment of the illustrated (byte.bit) - view to your INTERBUS control or computer system, please refer to the DB GB IBS SYS ADDRESS data sheet, Order No. 9000990.

© PHOENIX CONTACT 01/2007