

# Operating Instructions

## IPS.LBA-1

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## 1. General

### 1.1. Various Subassembly Designs/Indexes

Subassemblies from Index D onwards are a compatible further development. You can see this by the three additional LEDs at the top edge of the subassembly.

This description applies to both designs. The differences are described in the appropriate topics.

Subassemblies with Index C were never delivered.

### 1.2. Brief Description

- The IPS.LBA-1 (INTERBUS-Based Press I/O System . Loop Bus Adapter - Type 1) is an INTERBUS remote bus node (bus terminal) and is for linking an INTERBUS loop spur.
- Localizes interruptions in the connected loop spur.
- The INTERBUS IN and OUT remote bus interfaces are executed in two-wire technology (9-pin Sub-D) in accordance with the Interbus specification.
- Separate supply feed for loop and bus terminal logic, which are also galvanically isolated but can be connected externally.
- integrated mains unit for the I/O subassemblies that are connected to the loop – supplies 28.5 V DC.
- Functions only in INTERBUS systems that are controlled by master firmware of Version G4 and above
- Diagnostics LEDs for the status of the INTERBUS and supply voltages
- No need to set DIL switches or jumpers
- ID code: 4 (04 hex)
- Number of data words: 0
- MAN Item Number: 16.86958-0022

### 1.3. Important Note!

**When using this subassembly you must also use the general system description (Item No.: T16.86902-0016) and the "Allgemeine Information - Interbus-Loop" [General Information on Interbus Loop](Item No.:T16.86902-0028)! This contains guides to configuration, assembly, commissioning and servicing.**

When configuring the loop, you must observe the permissible line lengths, the maximum loop current (1.8A) and the voltage drop in the loop!

For optimum functioning of the loop equipment, e.g. the brightness of bulbs, a voltage must be available at every location in the loop of between 23.5V and 30.0V DC.

Bus operation (cyclical data traffic) is guaranteed from 15.5V.

## 1.4. Technical Data

### 1.4.1. Programming Data / Identification on the INTERBUS

ID code:	04 <sub>hex</sub> (04 <sub>dec</sub> )
Data length:	0 bytes

### 1.4.2. General Technical Data

#### Climatic environmental conditions

- Operating temperature range: 0 ..+ 60°C with horizontal installation  
0 ..+ 40°C with vertical installation
- Relative humidity: 75% at 25°C, no condensation

#### Mechanical environmental conditions

- Vibrations according to IEC 60068-2-6: 5 g
- Shock according to IEC 60068-2-27: 15 g

Type of protection: IP 20 according to IEC 529

#### EMC

- Emitted interference according to EN 55011 Class A
- Immunity to interference according to IEC 61000-4-2 (ESD) Class 3, assessment criterion 2
- Immunity to interference according to IEC 61000-4-3 (HF) 10 V / m, assessment criterion 1
- Immunity to interference according to IEC 61000-4-4 (Burst) Class 4, assessment criterion 2
- Immunity to interference according to IEC 61000-4-5 (Surge) Class 2, assessment criterion 3
- Immunity to interference according to IEC 61000-4-6 (HF conductor) 10 V, assessment criterion 1

#### Supply for IPS.LBA-1 internal logic (+24V<sub>L</sub> / 0V<sub>L</sub>)

- Rating: 24 V DC
- Permissible range: 20 .. 30 V (including ripple)
- Ripple: 1.2 V<sub>SS</sub>
- Polarized: yes by diode in series
- Current consumption: Index A, B: 100 mA  
Index D onwards: 130 mA
- Stored energy time in case of supply voltage failure: 10 ms
- Galvanic isolation to internal logic: 500V AC (test voltage)

#### Supply for loop (+24V<sub>SL</sub> / 0V<sub>SL</sub>)

- Rating: 24 V DC
- Permissible range: 20 .. 30 V (including ripple)
- Ripple: 1.2 V<sub>SS</sub>

- Polarized: yes, parallel diode + fuse
- Current consumption: Index A, B: 2 A max.  
Index D onwards: 2.3 A max.
- Galvanic isolation to internal logic: 500V AC (test voltage)

#### Combicon terminals

- Conductor area w/o connector sleeve: 0.2 ... 2.5 mm<sup>2</sup>
- Conductor area with connector sleeve: 0.2 ... 1.5 mm<sup>2</sup>
- Tightening torque: 0.8 Nm

### 1.4.3. Technical Data of Remote Bus Interfaces

Data transfer:	RS 485, two-wire asynchronous protocol, 500 kbps
Shielded lead length:	Maximum of 400 m
Electrical isolation of the IN interface:	500 V AC (test voltage)

### 1.4.4. Technical Data of Loop Interface (DT+, DT-, DR+, DR-)

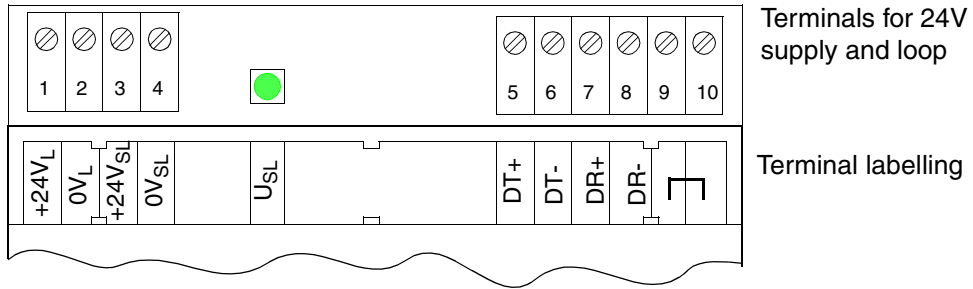
Data transfer:	Injected current signal to supply line, three-value Manchester coding
Maximum line length between two loop nodes (see also: Allgemeine Information - Interbus Loop [General Information on Interbus Loop])	Index A, B: 12 m Index D onwards: 20 m; but MAN ROLAND specification: 12m
Supply for loop subassemblies (output for loop connection, terminals 7 and 8)	
• Nominal voltage:	28.5V ± 5%
• Permissible load current:	1.8 A
• Short-circuit protection:	Electronic current limitation
• Stored energy time in case of supply voltage failure:	10 ms, while maintaining bus operation

### 1.4.5. Mechanical Data

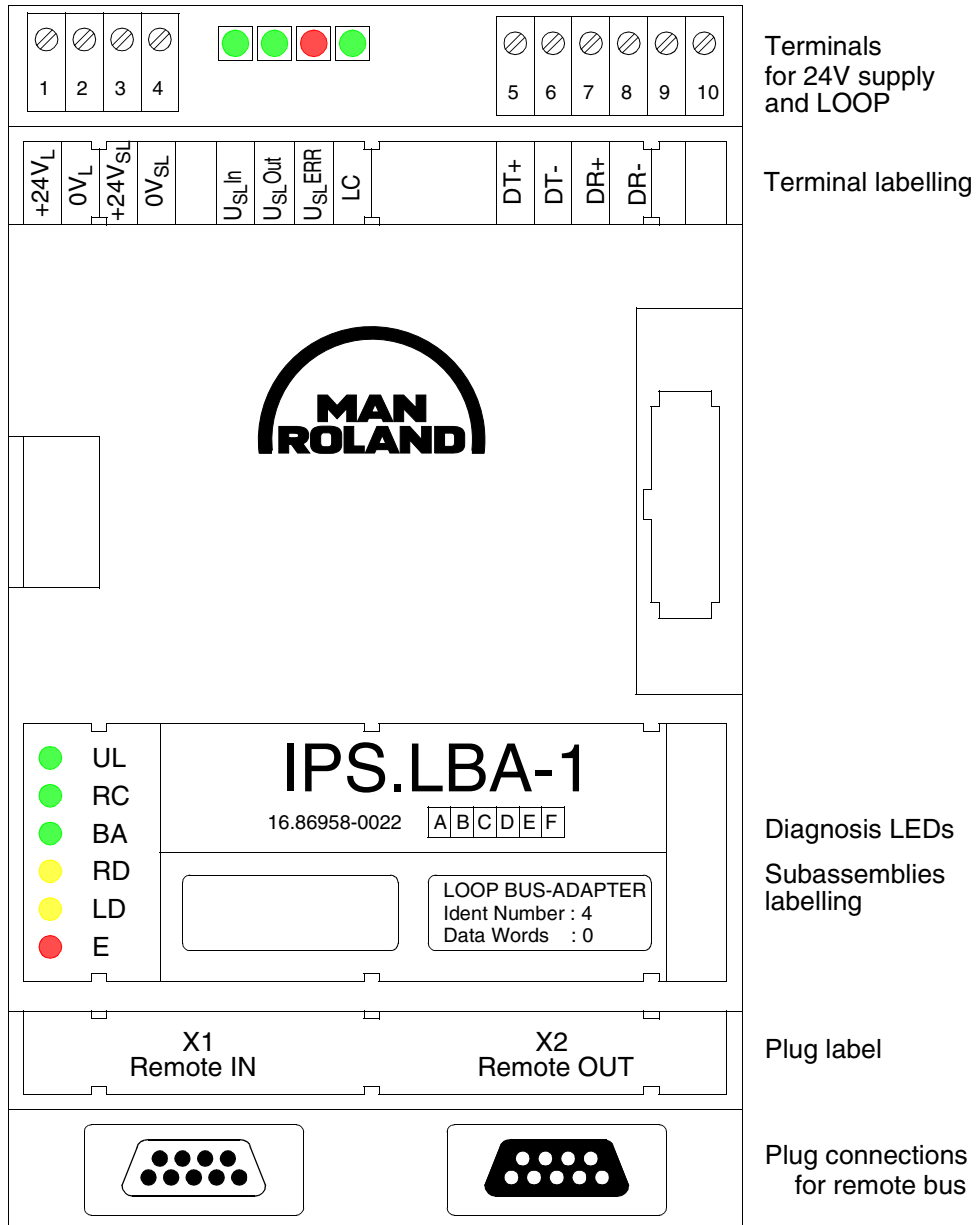
Dimensions of PCB:	94 x 160 mm
Module dimensions (H x W x D):	163 x 97 x 73 mm
Total height on mounting rail:	80 mm
Weight:	Approximately 500 g

### 1.5. Front View of Module

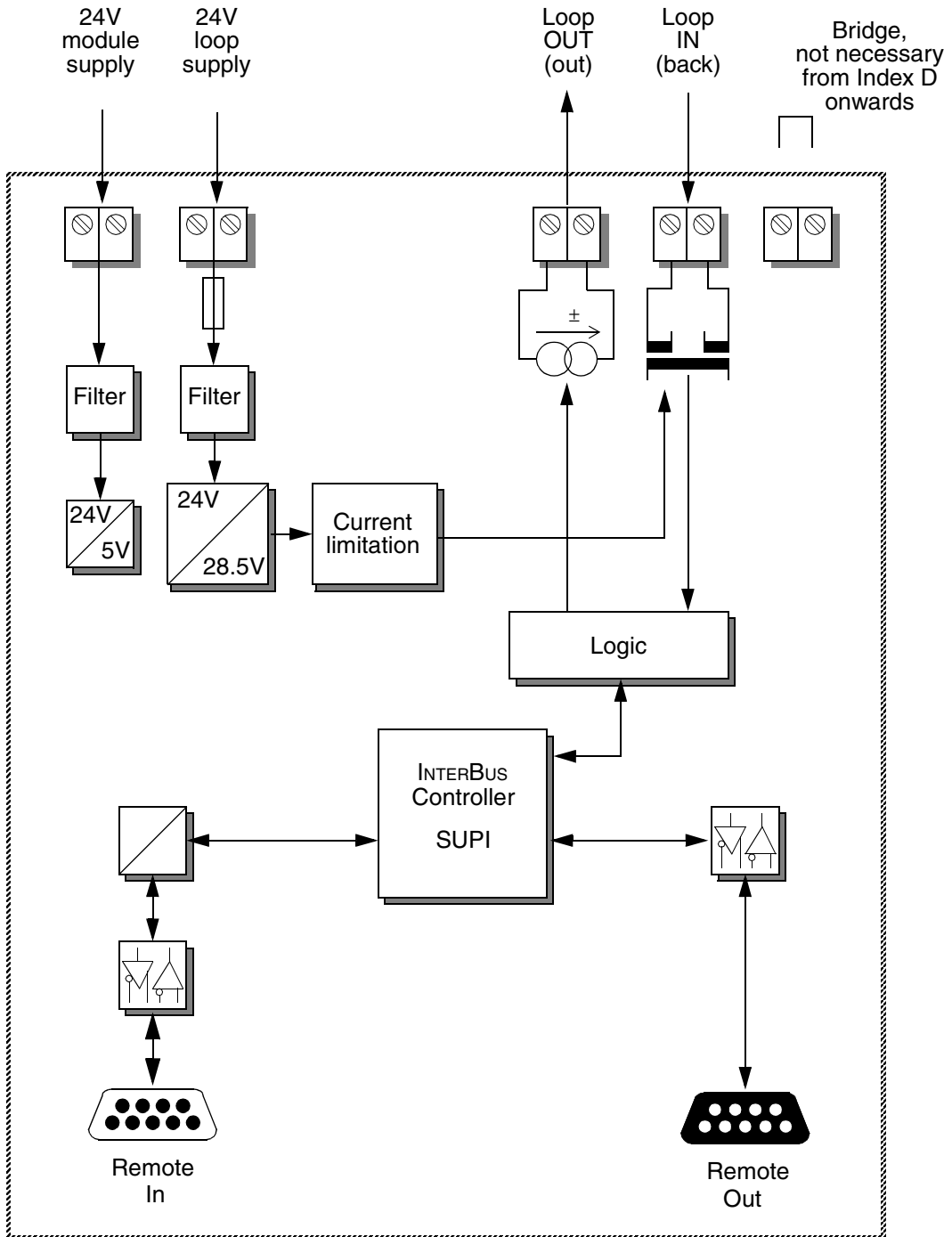
#### Subassemblies with Index A, B



#### Subassemblies from Index D onwards









## 2. Block Diagram




### 3. Diagnostics LEDs

#### 3.1. Subassemblies with Index A, B

The box below shows the functions of the six LEDs that are located on the left edge of the subassembly.

 UL	<b>UL</b> Monitoring the internal + 5 V logic voltage.	green LED
 RC	<b>Remote Bus Check</b> Monitoring the remote bus input cable: The LED is lit if the cable connection is OK and the Interbus master is not resetting. If the IN remote bus connection is disturbed, the LED does not light up.	green LED
 BA	<b>Bus Active</b> Shows cyclic data traffic across the Interbus signal lines.	green LED
 RD	<b>Remote Bus Disable</b> The OUT remote bus interface is disabled.	red LED
 LD	<b>Local Bus (Loop) Disable</b> The loop interface is disabled.	red LED
 E	<b>Error</b> The master can set this LED if it localizes an error on the IPS.LBA-1 or the I/O modules that are connected to it.	red LED







The box below shows the function of the LED that is located on the top edge of the subassembly.

 U <sub>SL</sub>	<b>Outgoing loop voltage</b> (terminals 7 and 8) If the LED is not lit: <ul style="list-style-type: none"> <li>• Short-circuit or overload in the connected loop</li> <li>• or +24V<sub>SL</sub> feed voltage not present</li> <li>• or internal fuse or switching controller defective</li> </ul>	green LED
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### 3.2. Subassemblies from Index D onwards

The box below shows the functions of the six LEDs that are located on the left edge of the subassembly.

	UL	<b>UL</b> Monitoring the internal + 5 V logic voltage.	green LED
	RC	<b>Remote Bus Check</b> Monitoring the remote bus input cable: The LED is lit if the cable connection is OK and the Interbus master is not resetting. If the IN remote bus connection is disturbed, the LED does not light up.	green LED
	BA	<b>Bus Active</b> Shows cyclic data traffic across the Interbus signal lines.	green LED
	RD	<b>Remote Bus Disable</b> The OUT remote bus interface is disabled.	yellow LED
	LD	<b>Local Bus (Loop) Disable</b> The loop interface is disabled.	yellow LED
	E	<b>Error</b> The master can set this LED if it localizes an error on the IPS.LBA-1 or the I/O modules that are connected to it.	red LED

The box below shows the functions of the four LEDs that are located on the top edge of the subassembly.

	U <sub>SL</sub> In	<b>Incoming loop voltage</b> (terminals 5 and 6) If the LED is not lit: <ul style="list-style-type: none"> <li>• U<sub>SL</sub>IN &lt; 15.5 V (polarity is of no consequence)</li> <li>• Peripheral error message 0BB1<sub>hex</sub> is generated</li> </ul>	green LED
	U <sub>SL</sub> Out	<b>Outgoing loop voltage</b> (terminals 7 and 8) If the LED is not lit: <ul style="list-style-type: none"> <li>• U<sub>SL</sub>OUT &lt; 19.2 V</li> <li>• Short-circuit or overload in the loop</li> <li>• or +24V<sub>SL</sub> feed voltage not present</li> <li>• or internal fuse or switching controller defective</li> </ul>	green LED
	U <sub>SL</sub> ERR	<b>Error in the loop voltage</b> <ul style="list-style-type: none"> <li>• If the LED flashes: Short-circuit or overload in the loop</li> <li>• If the LED is lit continuously: +24V<sub>SL</sub> feed voltage &lt; 20V</li> </ul>	red LED
	LC	<b>Loop Connect</b> Monitoring the Loop Receive data (terminals 7 and 8). If LC and U <sub>SL</sub> ERR are not lit: <ul style="list-style-type: none"> <li>• the last node in the loop is defective</li> <li>• or the connection from the last node in the loop to the IPS.LBA-1 is defective</li> <li>• or IPS.LBA-1 is defective</li> </ul>	green LED

## 4. Pin Configuration

### 4.1. Connector Pin Assignment of X1 Remote In

9-pin Sub-D male connector for connecting the incoming two-wire remote bus

Pin	Signal	Meaning
1	DO1	+ Data out
2	DI1	+ Data in
3	GND	Reference conductor
4	--	
5	--	
6	/DO1	- Data out
7	/DI1	- Data in
8	--	
9	--	

### 4.2. Connector Pin Assignment of X2 Remote OUT

9-pin Sub-D female connector for connecting the OUT two-wire remote bus

Pin	Signal	Meaning
1	DO2	+ Data out
2	DI2	+ Data in
3	GND	Reference conductor
4	--	
5	+5V	Logic voltage
6	/DO2	- Data out
7	/DI2	- Data in
8	--	
9	RBST	RBST signal

### 4.3. Assignment of the Terminals

#### 4-pin COMBICON screw terminal

You connect the supply voltage for the bus terminal electronics and the loop via this terminal block. Both voltages, including the reference conductor, must be fed and have no connection internally.

Pin	Signal	Meaning
1	+24V <sub>L</sub>	+24V module electronics
2	0V <sub>L</sub>	0 V module electronics
3	+24V <sub>SL</sub>	+24V loop supply
4	0V <sub>SL</sub>	0 V loop supply

#### 6-pin COMBICON screw terminal

You connect the Interbus loop spur via this terminal block. The jumper between pins 9 and 10 is necessary to be able to detect a connected loop.

From subassemblies with Index D onwards, this jumper is no longer necessary, since in this case the system carries out electronic loop detection by monitoring the loop voltage.

Pin	Signal	Meaning	
5	DT+	Data Transmit +	Data outward path = Loop OUT
6	DT-	Data Transmit -	
7	DR+	Data Receive +	Data return path = Loop IN and outgoing loop voltage $U_{SL}$ (Index A,B) or $U_{SL}OUT$ (Index D) respectively
8	DR-	Data Receive -	
9	LBST	Wire jumper; no longer necessary from subassemblies with Index D onwards.	
10	VCC		