

Universal Input/Output LB7104E

- 4-channel
- Inputs Ex ia, Outputs Ex ia
- Analog input, digital input, analog output, digital output
- Mounting in Zone 2, Class I/Div.2 or in the safe area
- Supply circuit 15 V (20 mA)
- HART communication via field bus or service bus
- Simulation mode for service operations (forcing)
- Line fault detection (LFD): one LED per channel
- Permanently self-monitoring
- Output with bus-independent safety shutdown

Universal input/output with HART communication and switch-off input



Function

The device is a configurable universal module. Each channel can operate in the following modes:

- As an analog input (AI) it feeds 2-wire transmitters.
- As an analog output (AO) it can drive proportional valves, I/P converters, or local indicators.
- As a digital input (DI) it reads dry contacts.
- As a digital output (DO) it can drive solenoids, sounders, or LED.

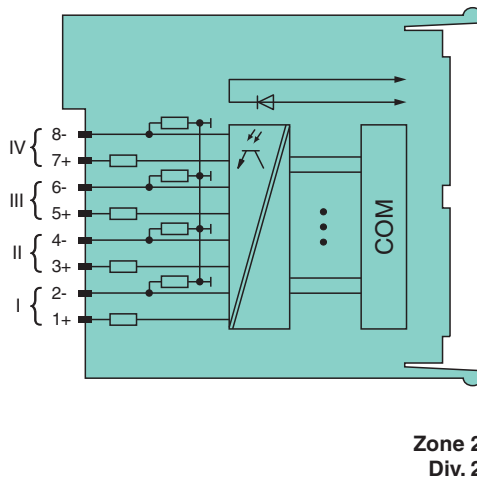
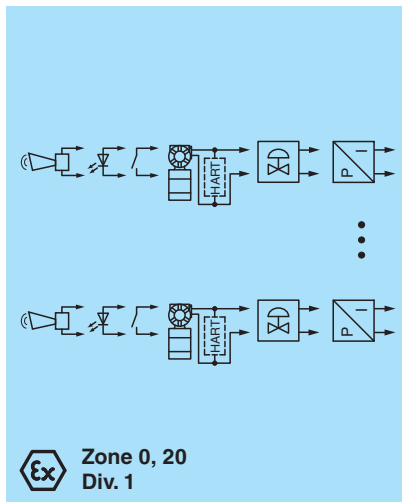
A combination of analog and digital I/O is possible.

Channel LEDs indicate the status of each channel. White LEDs indicate whether AI, AO, DI, DO are selected.

The outputs can be switched off via a contact. This can be used for bus independent safety applications.

The intrinsically safe signals are galvanically isolated from the bus and the power supply.

Wiring Diagram



Technical Data

Slots	
Occupied slots	1
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 2
Supply	
Connection	backplane bus
Rated voltage	U _r 12 V DC , only in connection with the power supplies LB9***
Power dissipation	2 W

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Technical Data

Power consumption	3 W
Internal bus	
Connection	backplane bus
Interface	manufacturer-specific bus to standard com unit
Analog input	
Number of channels	4
Suitable field devices	
Field device	pressure converter
Field device [2]	flow converter
Field device [3]	level converter
Field device [4]	Temperature Converter
Field device interface	
Connection	2-wire transmitter
Connection	terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-
Transmitter supply voltage	min. 15 V at 20 mA ; 21.5 V at 4 mA
Input resistance	15 Ω
Line fault detection	can be switched on/off for each channel via configuration tool , configurable via configuration tool
Short-circuit	factory setting: > 21 mA Can be parameterized in the range 0 ... 22 mA
Open-circuit	factory setting: < 3.6 mA Can be parameterized in the range 0 ... 22 mA
HART communication	yes
HART secondary variable	yes
Analog output	
Number of channels	4
Suitable field devices	
Field device	Proportional Valve
Field device [2]	I/P converters
Field device [3]	on-site display
Connection	terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-
Current	0 ... 20 mA short-circuit protected
Line fault detection	can be switched on/off for each channel via configuration tool , configurable via configuration tool
Short-circuit	factory setting: < 50 Ω configurable between 0 ... 26 mA
Open-circuit	deviation of preset output value > 0.5 mA
Load	max. 750 Ω at 20 mA
HART communication	yes
HART secondary variable	yes
Watchdog	output off 0.5 s after serious fault
Digital input	
Number of channels	4
Sensor interface	
Connection [2]	volt-free contact
Connection	terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-
Line fault detection	can be switched on/off for each channel via configuration tool
Connection	mechanical switch with additional resistors (see connection diagram)
Short-circuit	> 7 mA
Open-circuit	< 0.1 mA
Digital signals (active)	
Switching point: ON	> 2.1 mA
Switching point: OFF	< 1.2 mA
Digital output	
Number of channels	4
Suitable field devices	
Field device	Solenoid Valve

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Technical Data

Field device [2]		audible alarm
Field device [3]		visual alarm
Connection		terminals 1+, 2-, 3+, 4-, 5+, 6-, 7+, 8-
Drive capability		12 V / 22 mA
Internal resistor	R_i	385 Ω
Current limit	I_{max}	22 mA
Open loop voltage	U_s	min. 22.7 V
Line fault detection		can be switched on/off for each channel via configuration tool
Test current		0.4 mA
Short-circuit		< 50 Ω
Open-circuit		< 0.2 mA
Transfer characteristics		
Deviation		
After calibration		0.1 % of the signal range at 20 °C (68 °F)
Influence of ambient temperature		0.1 %/10 K of the signal range
Refresh time		approx. 100 ms (4 channels)
Indicators/settings		
LED indication		Power LED (P) green: supply Diagnostic LED (I) red: module fault , red flashing: communication error , white: fixed parameter set (parameters from com unit are ignored) , white flashing: requests parameters from com unit Status LED (1-4) red: line fault (lead breakage or short circuit) , yellow: state of digital I/O (0/1) Configuration LED (AI, AO, DI, DO) white: selected channel mode
Coding		optional mechanical coding via front socket
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013
Conformity		
Electromagnetic compatibility		NE 21:2007
Degree of protection		IEC 60529:2000
Environmental test		EN 60068-2-14:2009
Shock resistance		EN 60068-2-27:2009
Vibration resistance		EN 60068-2-6:2008
Damaging gas		EN 60068-2-42:2003
Relative humidity		EN 60068-2-78:2001
Ambient conditions		
Ambient temperature		-40 ... 60 °C (-40 ... 140 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		95 % non-condensing
Altitude		max. 2000 m
Shock resistance		shock type I, shock duration 11 ms, shock amplitude 15 g, number of shocks 18
Vibration resistance		frequency range 10 ... 150 Hz; transition frequency: 57.56 Hz, amplitude/acceleration \pm 0.075 mm/1 g; 10 cycles frequency range 5 ... 100 Hz; transition frequency: 13.2 Hz amplitude/acceleration \pm 1 mm/0.7 g; 90 minutes at each resonance
Damaging gas		designed for operation in environmental conditions acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications		
Degree of protection		IP20 when mounted on backplane
Connection		removable front connector with screw flange (accessory) wiring connection via spring terminals (0.14 ... 1.5 mm ²) or screw terminals (0.08 ... 1.5 mm ²)
Mass		approx. 100 g
Dimensions		16 x 100 x 102 mm (0.63 x 3.9 x 4 inch)
Height		100 mm
Width		16 mm

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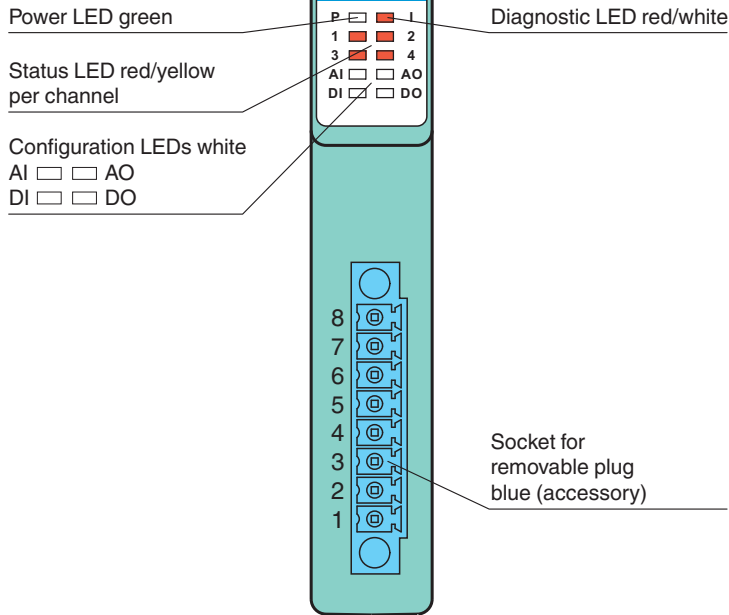
Technical Data

Length	103 mm		
Data for application in connection with hazardous areas			
EU-type examination certificate	BVS 11 ATEX E 116 X		
Marking		Ⓢ II 3(1) G Ex nA [ia Ga] IIC T4 Gc Ⓢ I (M1) [Ex ia Ma] I Ⓢ II (1) D [Ex ia Da] IIIC	
Input			
Voltage	U _o	27 V	
Current	I _o	87 mA	
Power	P _o	575 mW (linear characteristic)	
Output			
Voltage	U _o	27 V	
Current	I _o	87 mA	
Power	P _o	575 mW (linear characteristic)	
Galvanic isolation			
Rated voltage	U _m	250 V field circuits to control and supply circuits	
Input/power supply, internal bus	safe electrical isolation acc. to EN 60079-11, voltage peak value 375 V		
Output/power supply, internal bus	safe electrical isolation acc. to EN 60079-11, voltage peak value 375 V		
Directive conformity			
Directive 2014/34/EU		EN IEC 60079-0:2018+AC:2020 EN 60079-11:2012 EN 60079-15:2010	
International approvals			
ATEX approval		BVS 11 ATEX E 116 X	
UL approval		E106378	
IECEx approval			
IECEx certificate		IECEx BVS 11.0068X	
IECEx marking		Ex nA [ia Ga] IIC T4 Gc [Ex ia Da] IIIC [Ex ia Ma] I	
General information			
System information		The module has to be mounted in appropriate backplanes (LB9***) in Zone 2 or outside hazardous areas. Here, observe the corresponding declaration of conformity. For use in hazardous areas (e. g. Zone 2, Zone 22 or Div. 2) the module must be installed in an appropriate enclosure.	
Supplementary information		EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com .	

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Assembly

Front view



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