

ASi-5/ASi-3 EtherCAT Gateway with integrated Safety Monitor

ASi-5 – Great data bandwidth, short cycle times

Compatible with all ASi generations

ASi-5 master and ASi-3 master in one device

Safety communication over Safe Link

1 ASi Master, EtherCAT-Slave

Up to 64 release circuits

- up to 6 release circuits SIL 3, cat. 4 on the Monitor, electronic safe outputs

Safe ASi outputs are supported

- up to 64 independent ASi outputs
Multiple safe ASi outputs possible via a single ASi address

OPC UA server and integrated web server for simplified diagnostics

Selection of Mode of Safe Operation

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data



(figure similar)



Figure	Type	Inputs Safety, SIL 3, cat. 4	Inputs Safety, expandable to	Outputs Safety, SIL 3, cat. 4	Safety outputs, independent according to SIL 3, expandable to	Safety communication	Number of ASi networks, number of ASi Master ⁽¹⁾	1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies ⁽²⁾	Diagnostic and configuration interface ⁽³⁾	Art. no.
	Safety EtherCAT, ASi-5 / ASi-3	3 x 2 channels	max. 31 x 2 channels, max. 1891 in max. configuration	6 release circuits; 6 x electronic safe outputs	max. 64, max. 1984 in max. configuration	Safe Link	1 ASi network, 1 ASi Master	yes, max. 4 A/ASi network	Ethernet diagnostic	BWU3991

⁽¹⁾ **Number of ASi networks, number of ASi Master**
"Single Master": 1 ASi network, 1 ASi Master.

⁽²⁾ **1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies**
"yes, max. 4 A/ASi network": Cost-effective power for 2 ASi networks with 1 power supply (optionally supply of multiple Single Gateways by 1 power supply). Operation with short cable lengths with standard 24 V power supply possible.

⁽³⁾ **Diagnostic and configuration interface**
"Ethernet diagnostic": Access to ASi master and safety monitor via Bihl+Wiedemann proprietary software over Ethernet diagnostics interface.

The latest version of the device description file of the gateway is available in the "Downloads" section of the respective device.

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Article no.	BWU3991
Fieldbus interface	
EtherCAT	RJ-45 acc. IEEE 802.3
OPC UA interface	OPC UA server + web server
Baud rates	100 MBaud
Card slot	chip card (512 KB) for storage of configuration data
Ethernet interface	
Baud rate	100 MBaud full-duplex
Safety communication	Safe Link
Safe coupling ⁽¹⁾	-
ASi	
ASi specification	ASi-3 + ASi-5
Cycle time	Cycle time ASi-3 (variable): 150 µs * (number of ASi-3 slaves + 2) Cycle time ASi-5 (constant): 1,27 ms for 384 bits input data + 384 bits output data
Operating voltage	30 V _{DC} (20 ... 31,6 V) (PELV voltage)
ASi Power24V capability ⁽²⁾	yes
AUX	
Operating voltage	24 V _{DC} (19,2 ... 28,8 V)
Max current consumption	7,2 A
Display	
LCD	menu, indication of slave addresses and error messages in plain text
LED power (green)	power on
LED ect run (green)	EtherCAT communication active
LED config error (red)	configuration error
LED U ASi (green)	ASi voltage o.k.
LED ASi active (green)	ASi normal operation active
LED prg enable (green)	automatic addresses programming enabled
LED prj mode (yellow)	configuration mode active
LED AUX (green)	ASi power on and auxiliary power on
LEDs SI1 ... SI6 (yellow)	state of inputs: LED off: open LED on: closed
LEDs SO1 ... SO6 (yellow)	state of outputs: LED off: open LED on: closed
UL-specifications (UL508)	
External Protection	An isolated source with a secondary open circuit voltage of ≤ 30 V DC with a 3 A maximum over current protection. Over current protection is not required when a Class 2 source is employed.
In general	UL mark does not provide UL certification for any functional safety rating or aspects of the above devices.

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Article no.	BWU3991
Environment	
Standards	EN 60529 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, PL _e
Operating altitude	2000 m
Ambient temperature	0 °C ... +55 °C
Storage temperature	-25 °C ... +85 °C
Housing	stainless steel, for DIN rail mounting
Pollution Degree	2
Protection category	IP20
Tolerable loading referring to humidity	according to EN 61131-2
Maximum tolerable shock and vibration stress	according to EN 61131-2
Voltage of insulation	≥500 V
Weight	800 g
Dimensions (W / H / D in mm)	109 / 120 / 106

(1) Safe data exchange between safe protocols (e.g. CIP safety, PROFIsafe etc.).

(2) **ASi Power24V**

The device can be operated directly on a 24 V (PELV) power supply. The gateway has been optimized with integrated data coupling coils and adjustable self-resetting fuses for safe use of powerful 24 V power supplies.

Article no.	BWU3991
Safety monitor	
Start delay	< 10 ms
Max. turn-off time	< 40 ms
Antivalent switches for local inputs	yes
Standstill monitors for local inputs	6 axes, up to 50 Hz ⁽¹⁾
Speed monitors for local inputs	3 to 6 axes, up to 400 Hz ⁽²⁾
Connection	
Connection	COMBICON
Length of connector cable	unlimited ⁽³⁾
Input	
Inputs Safety, SIL3, cat. 4	3 x 2 channels ⁽⁴⁾
Inputs digital, EDM	up to 6 standard inputs ⁽⁴⁾
Switching current	15 mA (T = 100 μs), continuously 4 mA at 24 V
Power supply	out of AUX
Sensor supply	short-circuit and overload protected according to EN 61131-2
Output	
Number of release circuits on the monitor	6
Outputs	semiconductor output max. contact load: 1,2 A _{DC-13} at 30 V, Σ = 7,2 A in sum ⁽⁵⁾
Power supply (semiconductor outputs)	out of AUX
Output	short-circuit and overload protected according to EN 61131-2
Test pulse (semiconductor outputs)	if output is on: minimum interval between 2 test pulses: 250 ms; maximum pulse width 1 ms

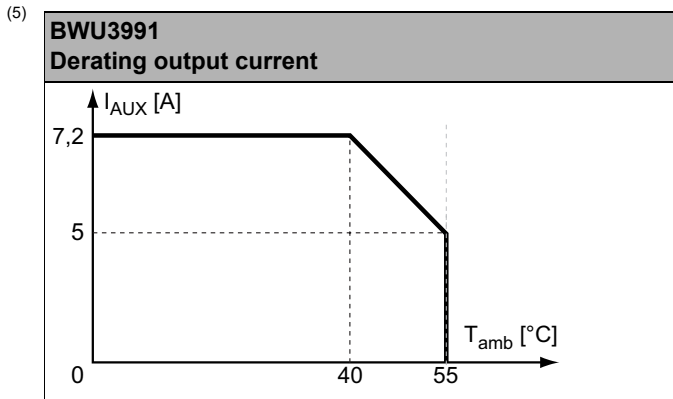
(1) connection at all SI or SO terminals possible.

(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU3991")

(3) loop resistance ≤150 Ω

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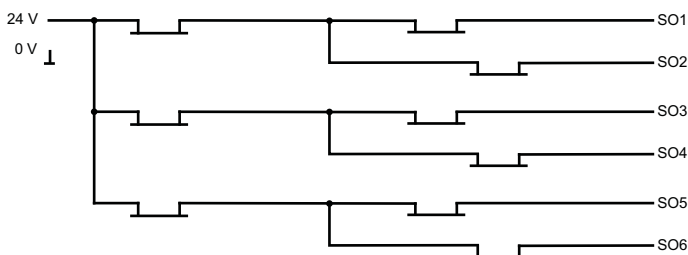
(4) see "Variations of terminal configuration for BWU3991"



Article no.	Operating current		
	master power supply, approx 300 mA out of ASi network	master power supply, max. 300 mA out of ASi circuit 1 (approx. 70 mA ... 300 mA), max. 300 mA out of ASi circuit 2 (approx. 70 mA ... 300 mA); in sum max. 370 mA	Version „1 Gateway, 1 power supply for 2 ASi circuits“, ca. 300 mA (PELV voltage)
BWU3991	-	-	•

	BWU3991
Redundant power supply out of ASi: all fundamental functions of the device remain available even in case of power failure in one of the two ASi networks	-
Current measurement of the ASi circuits	•
Self-resetting adjustable fuses	•
ASi earth fault monitor distinguishes between ASi cable and sensor cable	•
In version „1 gateway, 1 power supply for 2 ASi circuits“: only 1 gateway + 1 ASi power supply is needed for both 2 ASi circuits	•

Safety outputs block diagram BWU3991:



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Variations of terminal configuration for BWU3991

Terminal	Safe output	Safe input for mechanical contacts in combination with T1, T2 ⁽¹⁾	Safe antivalent input ⁽¹⁾	Safe electronic input ⁽¹⁾	Standard input ⁽¹⁾
SI1,2	–	•	•	•	•
SI3,4	–	•	•	•	•
SI5,6	–	•	•	•	•
SO1,2 ⁽²⁾	•	•	•	–	•
SO3,4 ⁽²⁾	•	•	•	–	•
SO5,6 ⁽²⁾	•	•	•	–	•

(1) Inputs may only be supplied by the same 24 V source as the device itself.

(2) If outputs are configured as inputs, the input current has to be limited by an external element at ≤ 100 mA.

Connections: Gateway + Safety Monitor:

BWU3991	Connection	Description	
	SI1, SI3, SI5	Safe input terminal (T1)	
	SI2, SI4, SI6	Safe input terminal (T2)	
	T1	Clock output 1	
	T2	Clock output 2	
	SO1 ... SO6	Safe semiconductor outputs 1 ... 6	
	24 V, 0 V	Power supply for local I/Os	
	+ASi 1-	Connection of ASi circuit	
	ASi +PWR-	Power supply for Gateway and ASi networks	

Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- Chip card, memory capacity 512 kB (art. no. BW4055)
- Bihl+Wiedemann Safety Suite - Safety Software for Configuration, Diagnostics and Commissioning (art. no. BW2916)
- Power supplies, e.g.: 30 V power supply, 4 A, 3 phases (art. no. BW1927), 30 V power supply, 8 A, 3 phases (art. no. BW1676) (for further power supply units visit www.bihl-wiedemann.de/en/products/accessories/power-supplies)