

ASi-3 EtherCAT Gateways with integrated Safety Monitor

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Safety over EtherCAT (configurable as node or master)

Safety over EtherCAT (FSoE) and Safe Link in one device

- up to zu 450 Devices

Safely monitoring safety drives with Safety over EtherCAT (FSoE)

2 / 1 ASi-3 Master, EtherCAT Device

1 Safety Monitor for 2 ASi networks

- Operation using a single Monitor configuration!
Monitor processes safety nodes on two ASi networks
Coupling between the two networks superfluous

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

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data



(Figure similar)



Figure	Fieldbus Interface	Safety communication	Inputs Safety, SIL 3, Cat. 4	Outputs Safety, SIL 3, cat. 4	Inputs Safety, expandable to	Safety outputs, independent according to SIL 3, expandable to	Number of ASi networks, number of ASi Master ⁽¹⁾	Integrated decoupling, ASi current measurement in the gateway ⁽²⁾	Diagnostic and configuration interface ⁽³⁾	Article no.
	EtherCAT; OPC UA	FSoE + Safe Link	3 x 2 channels	6 release circuits; 6 x electronic safe outputs	max. 62 x 2 channels, max. 1922 in max. configuration	max. 64, max. 1984 in max. configuration	2 ASi networks, 2 ASi-3 Masters	yes, max. 4 A/ ASi network	Ethernet diagnostic	BWU3418
	EtherCAT; OPC UA	Safe Link	3 x 2 channels	6 release circuits; 6 x electronic safe outputs	max. 62 x 2 channels, max. 1922 in max. configuration	max. 32, max. 992 in max. configuration	2 ASi networks, 2 ASi-3 Masters	yes, max. 4 A/ ASi network	Ethernet diagnostic	BWU2944
	EtherCAT; OPC UA	FSoE + Safe Link	3 x 2 channels	6 release circuits; 6 x electronic safe outputs	max. 31 x 2 channels, max. 1891 in max. configuration	max. 32, max. 992 in max. configuration	1 ASi network, 1 ASi-3 Master	yes, max. 4 A/ ASi network	Ethernet diagnostic	BWU3509

⁽¹⁾ Number of ASi networks, number of ASi Master

"Single Master": 1 ASi network, 1 ASi-3 Master.

"Double Master": 2 ASi networks, 2 ASi-3 Masters.

⁽²⁾ Integrated decoupling, ASi current measurement in the gateway

"yes, max. 4 A/ASi network": Data decoupling integrated in the gateway. 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.

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⁽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.

Article no.	BWU2944	BWU3509	BWU3418
Fieldbus Interface			
Type	EtherCAT; RJ-45 acc. IEEE 802.3		
Baud rates	100 MBd		
Card slot	chip card (128 KB) for storage of configuration data		
Diagnostic Interface			
Type	Ethernet; RJ-45 acc. IEEE 802.3		
ASi			
ASi specification	3.0		
Cycle time	150 μ s * (number of ASi-3 nodes + 2)		
Operating voltage	30 V _{DC} (20 ... 31,6 V) (PELV voltage)		
Operating current	300 mA		
ASi Power24V capability ⁽¹⁾	yes		
AUX			
Operating voltage	24 V _{DC} (19,2 ... 28,8 V)		
Max current consumption	7,2 A		
Display			
LCD	indication of ASi addresses and error messages in plain text		
LED status (green)	EtherCAT communication active		
LED power (green)	power on		
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 (yellow)	auxiliary power		
LEDs SI1 ... SI6 (yellow)	state of inputs: off: open on: close		
LEDs SO1 ... SO6 (yellow)	state of outputs: off: open on: close		
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.	BWU2944	BWU3509	BWU3418
Environment			
Applied Norms	EN 60529 EN 62026-2 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, PL e		
Operating altitude	max. 2000 m		
Ambient temperature	0 °C ... +55 °C		
Storage temperature	-25 °C ... +85 °C		
Housing	stainless steel, for DIN rail mounting		
Protection category	IP20		
Maximum tolerable shock and vibration stress	according EN 6131-2		
Voltage of insulation	≥ 500 V		
Weight	800 g		
Dimensions (W / H / D in mm)	100 / 120 / 96		

(1) 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.	BWU2944	BWU3509	BWU3418
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, Kat. 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		
Output			
Number of release circuits on the monitor	6		
Outputs	semiconductor output max. contact load: 1,2 A DC-13 at 30 V, $\Sigma = 7,2$ A in sum ⁽⁵⁾		
Power supply (semiconductor outputs)	out of AUX		
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.

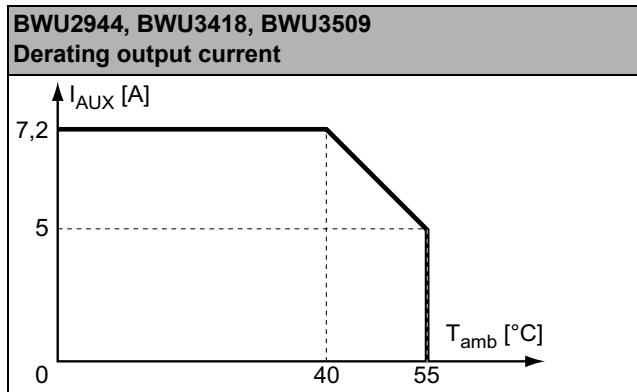
⁽²⁾ connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU2944, BWU3418, BWU3509")

⁽³⁾ loop resistance ≤ 150 Ω

⁽⁴⁾ see "Variations of terminal configuration for BWU2944, BWU3418, BWU3509"

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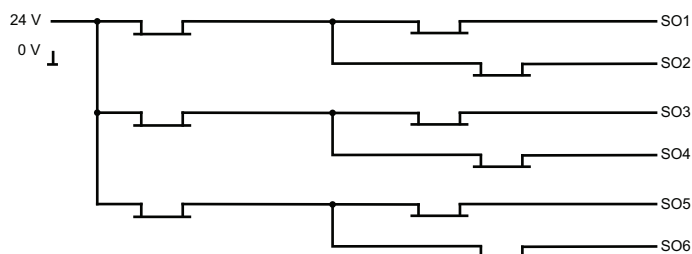
(5)



Article no.	Operating current		
	Master power supply, ca. 300 mA out of ASi circuits	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	Cost-effective power for 2 ASi networks with 1 power supply, approx. 300 mA (PELV voltage)
BWU2944	-	-	•
BWU3418	-	-	•
BWU3509	-	-	•

	BWU2944 / BWU3418 / BWU3509
Data decoupling integrated in the gateway	•
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	•
Cost-effective power for 2 ASi networks with 1 power supply	•

Safety outputs block diagram BWU2944, BWU3418, BWU3509



ASi-3 EtherCAT Gateways with integrated Safety Monitor

Variations of terminal configuration for BWU2944, BWU3418, BWU3509

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 must be supplied from the same 24 V voltage source connected to the supply terminals of the local safe I/Os of the device.

⁽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:

BWU3509	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	

BWU2944, BWU3418	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-, +ASI 2-	Connection of ASi circuits	
	ASI +PWR-	Power supply for Gateway and ASi networks	

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Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- Chip card, memory capacity 128 kB (art. no. BW2222)
- Bihl+Wiedemann Safety Suite - Safety Software for Configuration, Diagnostics and Commissioning (art. no. BW2916)
- Power supplies, e.g.: 30 V power supply, 4 A, 1 phase (art. no. BW4218), 30 V power supply, 8 A, 1 phase (art. no. BW4219), 30 V power supply, 8 A, 3 phases (art. no. BW4220), 30 V Power Supply, 16 A, 1 phase (art. no. BW4221), 30 V Power Supply, 16 A, 3 phases (art. no. BW4222) (for further power supply units visit www.bihl-wiedemann.de/en/products/accessories/power-supplies)