

# ASi-3 EtherCAT Gateways with integrated Safety Monitor

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Safety over EtherCAT (configurable as slave 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 Master, EtherCAT Slave

1 Safety Monitor for 2 ASi networks

- Operation using a single Monitor configuration!  
Monitor processes safety slaves 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	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 <sup>(1)</sup>	1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies <sup>(2)</sup>	Diagnostic and configuration interface <sup>(3)</sup>	Article no.
	Safety EtherCAT	3 x 2 channels	max. 62 x 2 channels, max. 1922 in max. configuration	6 release circuits; 6 x electronic safe outputs	max. 64, max. 1984 in max. configuration	FSoE + Safe Link	2 ASi networks, 2 ASi Masters	yes, max. 4 A/ ASi network	Ethernet diagnostic	<b>BWU3418</b>
	Safety EtherCAT	3 x 2 channels	max. 62 x 2 channels, max. 1922 in max. configuration	6 release circuits; 6 x electronic safe outputs	max. 32, max. 992 in max. configuration	Safe Link	2 ASi networks, 2 ASi Masters	yes, max. 4 A/ ASi network	Ethernet diagnostic	<b>BWU2944</b>
	Safety EtherCAT	3 x 2 channels	max. 31 x 2 channels, max. 1891 in max. configuration	6 release circuits; 6 x electronic safe outputs	max. 32, max. 992 in max. configuration	FSoE + Safe Link	1 ASi network, 1 ASi Master	yes, max. 4 A/ ASi network	Ethernet diagnostic	<b>BWU3509</b>
	Safety EtherCAT	3 x 2 channels	max. 31 x 2 channels, max. 1891 in max. configuration	6 release circuits; 6 x electronic safe outputs	max. 31, max. 991 in max. configuration	Safe Link	1 ASi network, 1 ASi Master	yes, max. 4 A/ ASi network	Ethernet diagnostic	<b>BWU2797</b>

<sup>(1)</sup> **Number of ASi networks, number of ASi Master**

**"Single Master"**: 1 ASi network, 1 ASi Master.

**"Double Master"**: 2 ASi networks, 2 ASi Masters.

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- (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.
- (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.	BWU2797	BWU2944	BWU3509	BWU3418
<b>Interface</b>				
EtherCAT	RJ-45 acc. IEEE 802.3			
Baud rates	100 MBd			
Card slot	chip card (128 KB) for storage of configuration data			
<b>ASi</b>				
ASi specification	3.0			
Cycle time	150 $\mu$ s * (number of slaves + 2)			
Operating voltage	30 V <sub>DC</sub> (20 ... 31,6 V) (PELV voltage)			
ASi Power24V capability <sup>(1)</sup>	yes			
<b>AUX</b>				
Operating voltage	24 V <sub>DC</sub> (19,2 ... 28,8 V)			
Max current consumption	7,2 A			
<b>Display</b>				
LCD	indication of slave 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			
<b>UL-specifications (UL508)</b>				
External Protection	An isolated source with a secondary open circuit voltage of $\leq$ 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.			
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			
<b>Environment</b>				
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	$\geq$ 500 V			
Weight	800 g			
Dimensions (W / H / D in mm)	100 / 120 / 96			

# ASi-3 EtherCAT Gateways with integrated Safety Monitor

(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.	BWU2797	BWU2944	BWU3509	BWU3418
<b>Safety monitor</b>				
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 <sup>(1)</sup>			
Speed monitors for local inputs	3 to 6 axes up to 400 Hz <sup>(2)</sup>			
<b>Connection</b>				
Connection	COMBICON			
Length of connector cable	unlimited <sup>(3)</sup>			
<b>Input</b>				
Inputs Safety, SIL3, Kat. 4	3 x 2 channels <sup>(4)</sup>			
Inputs digital, EDM	up to 6 standard inputs <sup>(4)</sup>			
Switching current	15 mA (T = 100 µs), continuously 4 mA at 24 V			
Power supply	out of AUX			
<b>Output</b>				
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 <sup>(5)</sup>			
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			

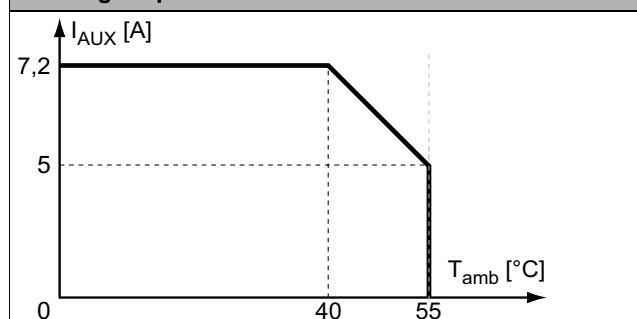
(1) connection at all SI or SO terminals possible.

(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU2797, BWU2944, BWU3418, BWU3509")

(3) loop resistance  $\leq 150 \Omega$

(4) see "Variations of terminal configuration for BWU2797, BWU2944, BWU3418, BWU3509"

(5) **BWU2794, BWU2944, BWU3418, BWU3509**  
**Derating output current**

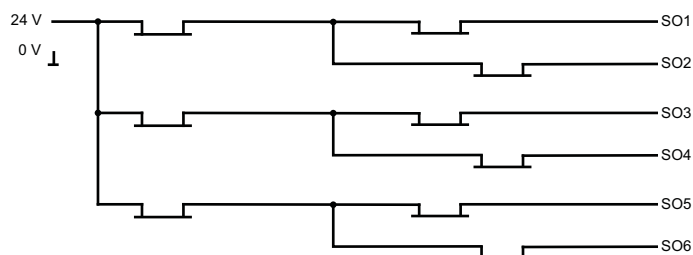


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Article no.	Operating current		
	Master power supply, ca. 300 mA out of ASi circuits	Master power supply, max. 300 mA out of ASi circuit 1 (approx. 70 mA ... 300 mA), max. 300 mA out of ASi circuit 2 (approx. 70 mA ... 300 mA); in sum max. 370 mA	Version „1 gateway, 1 power supply, for 2 ASi networks“, approx. 300 mA (PELV voltage)
BWU2797	-	-	•
BWU2944	-	-	•
BWU3418	-	-	•
BWU3509	-	-	•

	BWU2797 / BWU2944 / BWU3418 / BWU3509
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 BWU2797, BWU2944, BWU3418, BWU3509



## Variations of terminal configuration for BWU2797, BWU2944, BWU3418, BWU3509

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

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

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

# ASi-3 EtherCAT Gateways with integrated Safety Monitor

## Connections: Gateway + Safety Monitor:

BWU2797, 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	

## 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.: ASi power supply, 4 A (art. no. BW1649), ASi power supply, 8 A (art. no. BW1997)  
(further power supply units can be found at [www.bihl-wiedemann.de/en/products/accessories/power-supplies](http://www.bihl-wiedemann.de/en/products/accessories/power-supplies))