

ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway with integrated ASi-5/ASi-3 Safety Monitor



ASi-5 – Great data bandwidth, short cycle times

Compatible with all ASi generations

Safety Monitor supports ASi-5 Safety ⁽¹⁾ and ASi-3 Safety

2 ASi-5/ASi-3 masters, EtherNet/IP ⁽²⁾ + Modbus TCP device
• switch integrated

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



(figure similar)

Safe Link

OPC UA interface and REST API for IIoT applications

Integrated web server for simple diagnostics and maintenance

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Large chip card for storage of configuration and additional data



⁽¹⁾ ASi-5 Safety from ident. no. ≥21527.

⁽²⁾ EtherNet/IP[™], CIP[™] and CIP Safety[™] are registered trademarks of ODVA[®], Inc.

Figure	Interface, field-bus	Safety communication	Inputs Safety ⁽¹⁾	Outputs Safety, SIL 3, cat. 4	ASi-5/ASi-3	ASi Safety	Number of ASi networks, number of ASi Master ⁽²⁾	Integrated decoupling, current measurement in gateway ⁽³⁾	Art. no.
	EtherNET/IP + Modbus TCP, OPC UA	Safe Link	6 x 1 channel or 3 x 2 channels	6 release circuits; 6 x electronic safe outputs	ASi-5 + ASi-3 compatible	ASi-5 Safety ⁽⁴⁾ + ASi-3 Safety compatible	2 ASi networks, 2 ASi-5/ASi-3 Masters	yes, optimized for 2 x NEC Class 2 power supplies	BWU3947

⁽¹⁾ **Inputs Safety**

Safe inputs can be configured as 1-channel or 2-channel depending on the desired application or PL and SIL level. Suitable for applications up to category 4/PLe/SIL3.

⁽²⁾ **Number of ASi networks, number of ASi Master**

"Single Master": 1 ASi network, 1 ASi-5/ASi-3 Master.

"Double Master": 2 ASi networks, 2 ASi-5/ASi-3 Masters.

⁽³⁾ **Integrated decoupling, current measurement in gateway:**

Data decoupling integrated in the gateway. Optimized for use with 2 x UL certified 30 V/3 A power supplies with power limitation <100 W (BW4223). In combination 2 separate NEC Class 2 compliant ASi circuits are created.

⁽⁴⁾ ASi-5 Safety from ident. no. ≥21527.

ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway with integrated ASi-5/ASi-3 Safety Monitor

Article no.	BWU3947
Fieldbus interface	
Type	EtherNet/IP 2 x RJ-45, integrated 2-Port-Switch, Ethernet + Modbus TCP acc. to IEEE 802.3
Transmission rate	10/100 MBit/s
Safety communication	Safe Link
IT interface	OPC UA server, web server, REST API
Variably configurable Assembly Objects	yes
Function	Device Level Ring (DLR) (Ethernet/IP only)
Card slot	Chip card (BW4785) for storage of configuration and additional data
Diagnostic interface	
Type	Ethernet; RJ-45 acc. to IEEE 802.3
Transmission rate	10/100 MBit/s
Safety communication	Safe Link
IT interface	OPC UA server, web server, REST API
Programming in C	
Control III	optional
ASi	
ASi specification	ASi-5 + ASi-3
Cycle time	Cycle time ASi-5 (constant): 1,27 ms for 384 bits input data + 384 bits output data Cycle time ASi-3 (variable): 150 µs * (number of ASi-3 nodes + 2)
ASi Safety	ASi-5 Safety ⁽²⁾ and ASi-3 Safety compatible
Operating voltage	30 V _{DC} (20 ... 31,6 V) (PELV voltage)
Operating current	max. 400 mA
Current per ASi network	max 4 A, optimized for use with 2 x UL-certified 30 V/3 A power supplies with power limitation <100 W
ASi Power24V capability ⁽¹⁾	yes
AUX	
Operating voltage	24 V _{DC} (19,2 ... 28,8 V)
Max current consumption	7,2 A
Display	
LCD	menu, indication of ASi addresses and error messages in plain text
LED power (green)	power on
LED net (green)	Ethernet network 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 address 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 voltage source with a PELV / SELV voltage ≤30 VDC must have internal or external current limiting.
In general	UL mark does not provide UL certification for any functional safety rating or aspects of the above devices.

ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway with integrated ASi-5/ASi-3 Safety Monitor

Article no.	BWU3947
Environment	
Applied standards	EN 60529 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, PLe
Operating altitude	2000 m
Ambient temperature	-25 °C ... +55 °C (no condensation permitted)
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) ASi Power24V

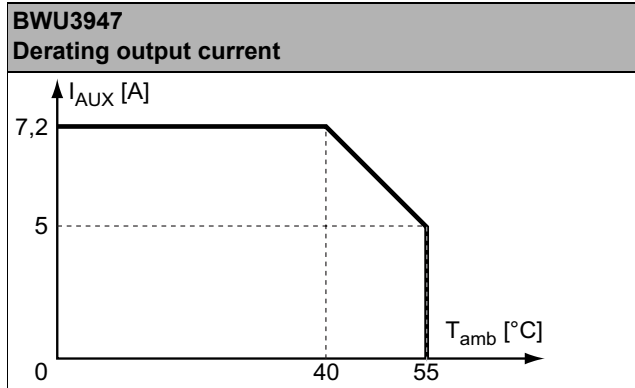
The device can be operated directly on a 24 V (PELV) power supply. The gateway has been optimized with integrated data coupling coils and adjustable self-resetting fuses for safe use of powerful 24 V power supplies.

(2) ASi-5 Safety from ident. no. ≥21527.

Article no.	BWU3947
Safety monitor	
ASi Safety	ASi-5 Safety ⁽¹⁾ and ASi-3 Safety compatible
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 ⁽²⁾
Speed monitors for local inputs	3 to 6 axes, up to 400 Hz ⁽³⁾
Selection of Mode of Safe Operation	yes
Connection	
Connection	COMBICON
Length of connector cable	unlimited ⁽⁴⁾
Input	
Inputs Safety, SIL3, cat. 4	up to 6 x 1-channel safe inputs (SIL1, cat. 2, PLc) or up to 3 x 2-channel safe inputs (SIL3, cat. 4, PLe) ⁽⁵⁾
Inputs digital, EDM	up to 12 standard inputs ⁽⁵⁾
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 release circuits; 6 x electronic safe outputs ⁽⁵⁾
Outputs	semiconductor output max. contact load: 1,2 A _{DC-13} at 30 V, Σ = 7,2 A in sum ⁽⁶⁾
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

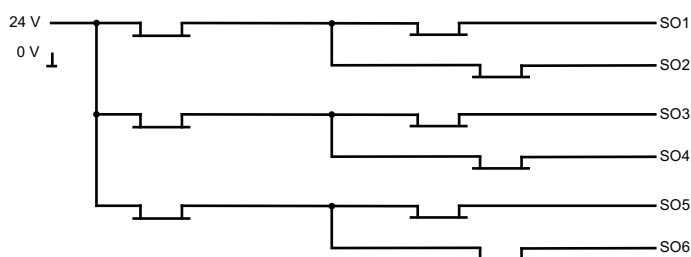
ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway with integrated ASi-5/ASi-3 Safety Monitor

- (1) ASi-5 Safety from ident. no. ≥ 21527 .
- (2) connection at all SI or SO terminals possible.
- (3) connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU3947")
- (4) loop resistance $\leq 150 \Omega$
- (5) see "Variations of terminal configuration for BWU3947"
- (6)



	BWU3947
Data decoupling integrated in the gateway	•
Current measurement of the ASi circuits	•
Self-resetting adjustable fuses	•
ASi earth fault monitor distinguishes between ASi cable and sensor cable	•
Optimized for use with 2 x UL-certified 30 V/3 A power supplies with power limitation <100 W	•

Safety outputs block diagram BWU3947:



ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway with integrated ASi-5/ASi-3 Safety Monitor

Variations of terminal configuration for BWU3947

Terminal	up to 6 safe outputs	up to 6 safe 2 channel inputs for floating contacts in combination with T1, T2 ⁽¹⁾	up to 6 safe 2 channel inputs for antivalent switches ⁽¹⁾	up to 3 safe 2 channel inputs for OSSDs	up to 12 safe 1 channel inputs ⁽¹⁾	up to 12 standard inputs ⁽¹⁾
SI1	–	•	•	•	•	•
SI2	–	•	•	•	•	•
SI3	–	•	•	•	•	•
SI4	–	•	•	•	•	•
SI5	–	•	•	•	•	•
SI6	–	•	•	•	•	•
SO1 ⁽²⁾	•	•	•	–	•	•
SO2 ⁽²⁾	•	•	•	–	•	•
SO3 ⁽²⁾	•	•	•	–	•	•
SO4 ⁽²⁾	•	•	•	–	•	•
SO5 ⁽²⁾	•	•	•	–	•	•
SO6 ⁽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 ≤ 100mA

Connections: Gateway + Safety Monitor:

BWU3947	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 1 +PWR- ASi 2 +PWR-	Power supply for Gateway and ASi networks

Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- Chip card for storage of configuration and additional data (art. no. BW4785)
- Bihl+Wiedemann Suite - Safety Software for Configuration, Diagnostics and Commissioning (art. no. BW2916)
- 30 V Power Supply, 100 W (art. no. BW4223) (for further power supply units visit www.bihl-wiedemann.de/en/products/accessories/power-supplies)
- EtherNet/IP Master Simulator Plus, One-Year License (art. no. BW4693)