

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

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2 / 1 ASi Master, EtherNet/IP + Modbus TCP-Device ⁽¹⁾

- switch integrated

Up to 64 release circuits

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

Safe ASi outputs are supported

- up to 32 independent ASi outputs
Multiple safe ASi outputs possible via a single ASi address

optionally with OPC UA server and integrated web server for simplified diagnostics

Significantly improved response times

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data



(figure similar)




(1) Modbus TCP from Ident.no.: 13076 (see lateral label).

Figure	Fieldbus Interface ⁽¹⁾	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 ⁽²⁾	Integrated decoupling, ASi current measurement in the gateway ⁽³⁾	Diagnostic and configuration interface ⁽⁴⁾	Art. no.
	EtherNet/IP + Modbus TCP	CIP Safety over EtherNet/IP + 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 fieldbus, Ethernet diagnostic	BWU3683
	EtherNet/IP + Modbus TCP	CIP Safety over EtherNet/IP	3 x 2 channels	6 release circuits; 6 x electronic safe outputs	max. 62 x 2 channels	max. 64	2 ASi networks, 2 ASi-3 Masters	yes, max. 4 A/ASi network	Ethernet fieldbus, Ethernet diagnostic	BWU2742
	EtherNet/IP + Modbus TCP + 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 fieldbus, Ethernet diagnostic	BWU3693
	EtherNet/IP + Modbus TCP	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 fieldbus, Ethernet diagnostic	BWU3543
	EtherNet/IP + Modbus TCP	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	no, max. 8A/ASi network, redundant supply	Ethernet fieldbus, Ethernet diagnostic	BWU3544
	EtherNet/IP + Modbus TCP	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. 31, max. 991 in max. configuration	1 ASi network, 1 ASi-3 Master	yes, max. 4 A/ASi network	Ethernet fieldbus, Ethernet diagnostic	BWU3542

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



Figure	Fieldbus Interface ⁽¹⁾	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 ⁽²⁾	Integrated decoupling, ASi current measurement in the gateway ⁽³⁾	Diagnostic and configuration interface ⁽⁴⁾	Art. no.
	EtherNet/IP + Modbus TCP	Safe Link	3 x 2 channels	4 release circuits; 2 x relay, 2 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 fieldbus, Ethernet diagnostic	BWU2579

(1) Fieldbus interface

Communication interface between fieldbus and gateway: interfaces for standardized fieldbus systems in industrial automation.

EtherNet/IP+ Modbus TCP ASi gateway: interface for an EtherNet/IP+ ModbusTCP fieldbus

OPC UA server: interface for the OPC UA communication

(2) 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.

(3) 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.

"no, max. 8 A/ASi network, redundant supply": 1 power supply per ASi network. Gateway is powered in normal operation from one of the two ASi power supplies. Should one ASi power supply fail, switching to the other ASi power supply allows all the diagnostics functions to be maintained and the unaffected ASi network continues to operate.

(4) Diagnostic and configuration interface

"Ethernet fieldbus + Ethernet diagnostic": Access to ASi Master and Safety Monitor with Bihl+Wiedemann software by using the Ethernet diagnostic interface or Ethernet fieldbus interface

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

Article no.	BWU2579	BWU3542 BWU3543 BWU3544	BWU3693	BWU2742	BWU3683
Fieldbus interface					
Type	Ethernet + Modbus TCP acc. to IEEE 802.3 2 x RJ-45, integrated 2-Port-Switch,				
Baud rate	10/100 MBaud				
Variably configurable Assembly Objects	–	yes		–	yes
OPC UA interface	–	OPC UA server + web server ⁽⁴⁾		–	OPC UA server + web server ⁽⁴⁾
Function	Device Level Ring (DLR) (Ethernet/IP only)				
Card slot	chip card (128 KB) for storage of configuration data				
Diagnostic interface					
Type	Ethernet; RJ-45 acc. to IEEE 802.3				
Baud rate	10/100 MBaud half-duplex or full-duplex ⁽³⁾				
Safety communication	Safe Link			CIP Safety over Ethernet/IP	CIP Safety over Ethernet/IP + Safe Link
Safe coupling ⁽¹⁾	–				yes, up to 16 Byte
ASi					
ASi specification	3.0				
Cycle time	150 µs * (number of nodes + 2)				
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	1 A	7,2 A			

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



Article no.	BWU2579	BWU3542 BWU3543 BWU3544	BWU3693	BWU2742	BWU3683
Display					
LCD	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 addresses programming enabled				
LED prj mode (yellow)	configuration mode active				
LED AUX (green)	auxiliary power				
LEDs 1.Y1, 1.Y2, 2.Y1, 2.Y2 (EDM/Start) (yellow)	state of inputs: LED off: open LED on: closed	-			
LEDs K1 ... K4 (green)	state of outputs: LED off: open LED on: closed	-			
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 $\leq 30 V_{DC}$ 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.				
cTÜVus	the device BWU2579 from Bihl + Wiedemann GmbH is safety certified by TÜV Rheinland of North America, Inc. according to UL-standards and meet the safety requirements for the North American market.				
Environment					
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	max. 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	$\geq 500 V$				
Weight	800 g				
Dimensions (W / H / D in mm)	109 / 120 / 106				

(1) Safe data exchange between safe protocols (e.g. CIP Safety, PROFI-safe 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.

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



- (3) BWU2579 from Ident. No. ≥ 16834 , Ident. No. < 16834 10 MBaud half-duplex.
 BWU3542 from Ident. No. ≥ 16785 , Ident. No. < 16785 10 MBaud half-duplex.
 BWU3543 from Ident. No. ≥ 16799 , Ident. No. < 16799 10 MBaud half-duplex.
 BWU3544 from Ident. No. ≥ 16798 , Ident. No. < 16798 10 MBaud half-duplex.

- (4) OPC UA communication and web server via fieldbus interface only.

Article no.	BWU2579	BWU2742 / BWU3542 / BWU3543 / BWU3544 / BWU3683 / BWU3693
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 ⁽²⁾
Speed monitors for local inputs	–	3 to 6 axes up to 400 Hz ⁽³⁾
Connection		
Connection	COMBICON	
Length of connector cable	I/O: max. 15 m	unlimited ⁽⁴⁾
Input		
Inputs Safety, SIL3, cat. 4	–	3 x 2 channels ⁽⁵⁾
Inputs digital, EDM	4	up to 6 standard inputs ⁽⁵⁾
Switching current	30 mA (T = 100 μ s), continuously 4 mA at 24 V	15 mA (T = 100 μ s), continuously 4 mA at 24 V
Power supply	out of ASi	out of AUX
Sensor supply	short-circuit and overload protected according to EN 61131-2	
Output		
Number of release circuits on the monitor	4	6
Outputs	relay outputs (output circuits 1 and 2) max. contact load ⁽¹⁾ : 3 A _{AC-15} at 30 V, 3 A _{DC-13} at 30 V	–
	semiconductor outputs (output circuits 3 and 4): max. contact load: 0,5 A _{DC-13} at 30 V	semiconductor output max. contact load: 1,2 A _{DC-13} at 30 V, $\Sigma = 7,2$ 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 (as from Safety Version 4.3); maximum pulse width 1,5 ms	if output is on: minimum interval between 2 test pulses: 250 ms; maximum pulse width 1 ms

(1) Protection via external fuse, max. 4 A semi time-lag.

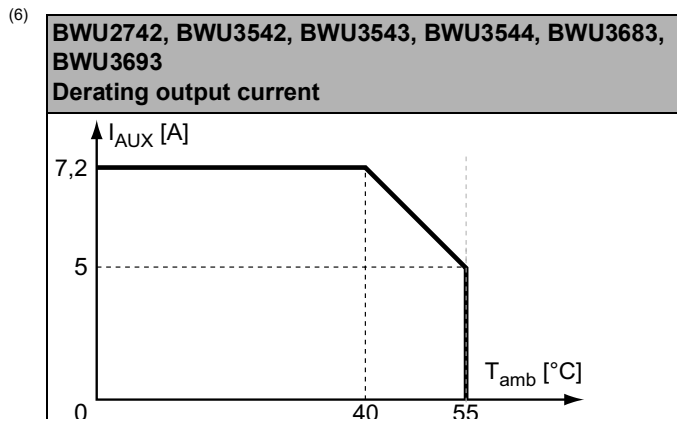
(2) connection at all SI or SO terminals possible.

(3) connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3544, BWU3683, BWU3693")

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

(5) see "Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3544, BWU3683, BWU3693"

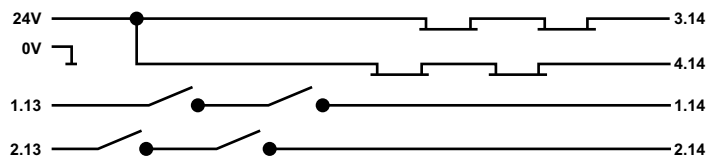
ASi-3 EtherNet/IP + Modbus TCP-Gateways with integrated Safety Monitor



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	Cost-effective power for 2 ASi networks with 1 power supply, ca. 350 mA (PELV voltage)
BWU2579	-	-	•
BWU2742	-	-	•
BWU3542	-	-	•
BWU3543	-	-	•
BWU3544	-	•	-
BWU3683	-	-	•
BWU3693	-	-	•

	BWU3544	BWU2579 / BWU2742 / BWU3542 / BWU3543 / BWU3683 / BWU3693
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 BWU2579:



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

Safety outputs block diagram

BWU2742, BWU3542, BWU3543, BWU3544, BWU3683, BWU3693:



Variations of terminal configuration for

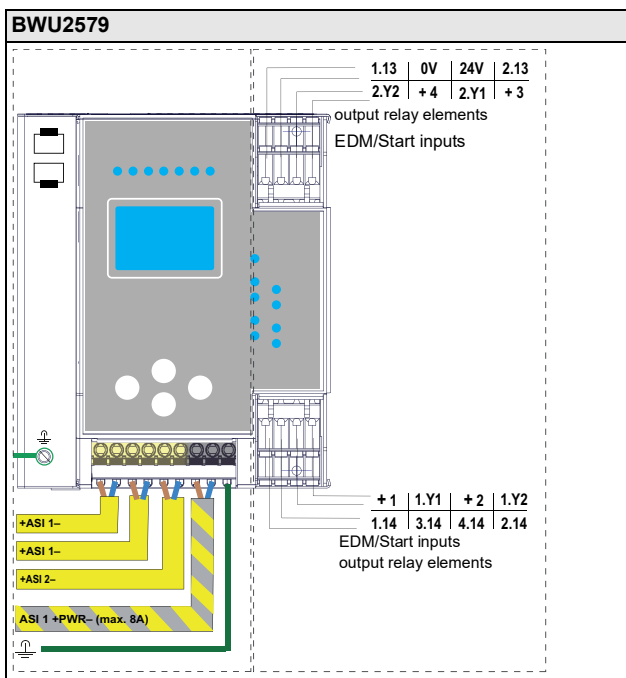
BWU2742, BWU3542, BWU3543, BWU3544, BWU3683, BWU3693

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⁾	•	•	•	–	•

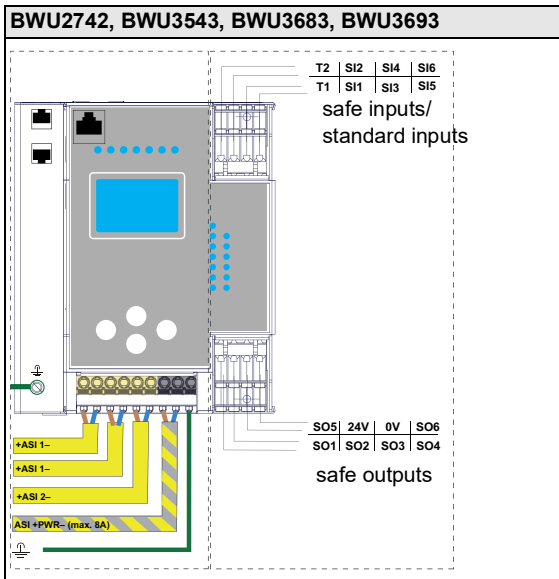
⁽¹⁾ Inputs may only be supplied by the same 24 V source as the device itself.

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

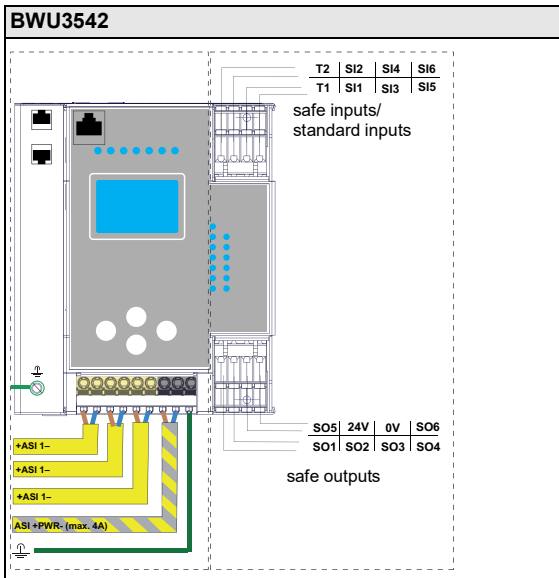
Connections: Gateway + Safety Monitor:



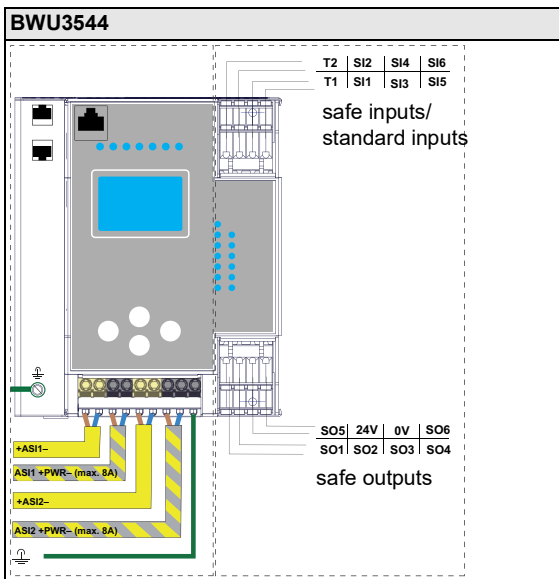
ASi-3 EtherNet/IP + Modbus TCP-Gateways with integrated Safety Monitor



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



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



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 circuit
ASI1 +PWR-, ASI2 +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 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)



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