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

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

(figure similar)

2 / 1 ASi-3 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

safe link

c UL us LISTED E227214

(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. 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**

(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.

(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.	BWU3542 BWU3543	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
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)		Full duplex (10/100 MBaud, both fieldbus ports must use the same data rate) (5)	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 (6)
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	7,2 A			

Article no.	BWU3542 BWU3543	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)	–			
LEDs K1 ... K4 (green)	–			
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.			
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	≥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.

(3) BWU3542 from Ident.No. ≥16785 half/full duplex (10/100 MBaud), BWU3543 from Ident.No. ≥16799 half/full duplex (10/100 MBaud),
BWU3542 from Ident.No. <16785 half duplex (10 MBaud),
BWU3543 for Ident.No. <16799 half duplex (10 MBaud)
BWU3683, BWU3693 half/full duplex (10/100 MBaud)

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

(5) BWU2742 from Ident.No. ≥20168 full duplex (10/100 MBaud)

(6) 16 Byte not supported by all PLCs. In this case only up to 12 Byte can be exchanged.

Article no.	BWU2742 / BWU3542 / BWU3543 / 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 (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, ∑ = 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.

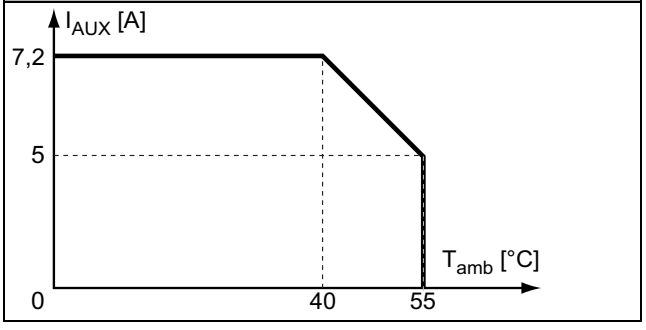
(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see “Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3683, BWU3693”)

(3) loop resistance ≤150 Ω

(4) see “Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3683, BWU3693”

(5)

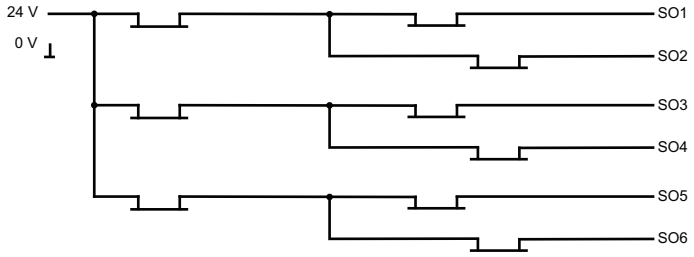
BWU2742, BWU3542, BWU3543, BWU3683, BWU3693
Derating output current



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)
BWU2742	–	–	●
BWU3542	–	–	●
BWU3543	–	–	●
BWU3683	–	–	●
BWU3693	–	–	●

	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 BWU2742, BWU3542, BWU3543, BWU3683, BWU3693:



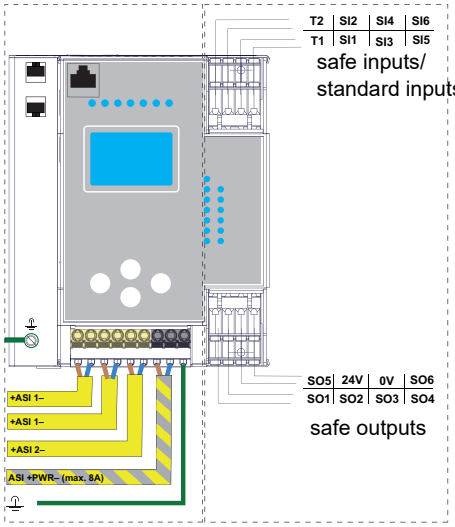
Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3683, BWU3693

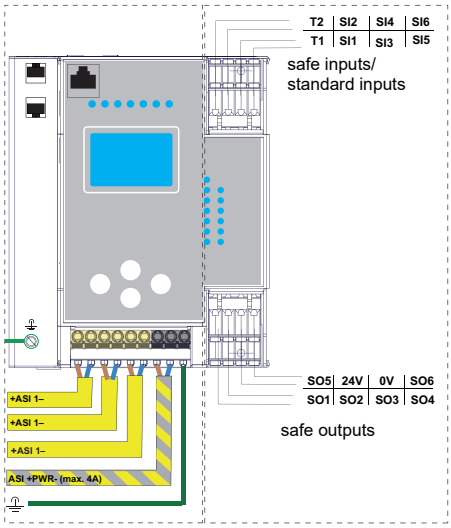
Terminal	Safe output	Safe input for mechanical contacts in combination with T1, T2 (1)	Safe antivalent input (1)	Safe electronic input (1)	Standard input (1)
SI1,2	–	●	●	●	●
SI3,4	–	●	●	●	●
SI5,6	–	●	●	●	●
SO1,2 (2)	●	●	●	–	●
SO3,4 (2)	●	●	●	–	●
SO5,6 (2)	●	●	●	–	●

(1) Inputs must be supplied from the same 24V 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:

BWU2742, BWU3543, BWU3683, BWU3693	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

BWU3542	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 128 KB (art. no. BW2222)**
- **Bihl+Wiedemann 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*)**