AS-i 3.0 EtherNet/IP + Modbus TCP-Gateways with integrated Safety Monitor

AS-i 3.0 EtherNet/IP + Modbus TCP-Gateways with integrated Safety Monitor

(figure similar)

2 / 1 AS-i Master, EtherNet/IP + Modbus TCP-Slave (1)

- **switch integrated**

Up to 64 release circuits

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

Safe AS-i outputs are supported

- **up to 32 independent AS-i outputs**
  Multiple safe AS-i outputs possible via a single AS-i address

Variably configurable Assembly Objects

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

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

Figure	Type	Inputs Safety, ex-pandable to	Outputs Safety, SIL 3, cat. 4	Safety outputs, independent according to SIL 3, expandable to	Safety communication	Number of AS-i networks, number of AS-i Master (1)	1 power supply, 1 gateway for 2 AS-i networks, inexpensive power supplies (2)	Diagnostic and configuration interface (3)	Art. no.
	Safety, EtherNet/IP + Modbus TCP	max. 62 x 2 channels	6 release circuits; 6 x fast electronic safe outputs	max. 64	CIP Safety over EtherNet/IP	2 AS-i networks, 2 AS-i Masters	yes, max. 4 A/AS-i network	Ethernet fieldbus, Ethernet diagnostic	**BWU2742**
	Safety, EtherNet/IP + Modbus TCP	max. 62 x 2 channels, max. 1922 in max. configuration	6 release circuits; 6 x fast electronic safe outputs	max. 32, max. 992 in max. configuration	Safe Link	2 AS-i networks, 2 AS-i Masters	yes, max. 4 A/AS-i network	Ethernet fieldbus, Ethernet diagnostic	**BWU3543**
	Safety, EtherNet/IP + Modbus TCP	max. 62 x 2 channels, max. 1922 in max. configuration	6 release circuits; 6 x fast electronic safe outputs	max. 32, max. 992 in max. configuration	Safe Link	2 AS-i networks, 2 AS-i Masters	no, max. 8A/AS-i network, redundant supply	Ethernet fieldbus, Ethernet diagnostic	**BWU3544**
	Safety EtherNET/IP + Modbus TCP	max. 31 x 2 channels, max. 1891 in max. configuration	6 release circuits; 6 x fast elec-tronic safe outputs	max. 31, max. 991 in max. configuration	Safe Link	1 AS-i network, 1 AS-i master	yes, max. 4 A/AS-i network	Ethernet fieldbus, Ethernet diagnostic	**BWU3542**
	Safety, EtherNet/IP + Modbus TCP	max. 62 x 2 channels, max. 1922 in max. configuration	4 release circuits; 2 x relay, 2 x fast electronic safe outputs	max. 32, max. 992 in max. configuration	Safe Link	2 AS-i networks, 2 AS-i Masters	yes, max. 4 A/AS-i network	Ethernet fieldbus, Ethernet diagnostic	**BWU2579**

(1) **Number of AS-i networks, number of AS-i Master**
"Single Master": 1 AS-i network, 1 AS-i Master.
"Double Master": 2 AS-i networks, 2 AS-i Masters.

(2) **1 power supply, 1 gateway for 2 AS-i networks, inexpensive power supplies**
"yes, max. 4 A/AS-i network": Cost-effective power for 2 AS-i 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/AS-i network, redundant supply": 1 power supply per AS-i network. Gateway is powered in normal operation from one of the two AS-i power supplies. Should one AS-i power supply fail, switching to the other AS-i power supply allows all the diagnostics functions to be maintained and the unaffected AS-i network continues to operate.

(3) **Diagnostic and configuration interface**
"Ethernet fieldbus + Ethernet diagnostic": Access to AS-i Master and Safety Monitor with Bihl+Wiedemann software by using the Ethernet diagnostic interface or Ethernet fieldbus interface (EDS file for the Gateway is built into the web server).

Article no.	BWU2579	BWU2742	BWU3542 BWU3543 BWU3544
Fieldbus interface			
Ethernet interface	2 x RJ-45, integrated 2-Port-Switch, Ethernet + Modbus TCP acc. to IEEE 802.3		
Baud rate	10/100 MBaud		
Function	Device Level Ring (DLR) (Ethernet/IP only)		
Card slot	chip card (128 KB) for storage of configuration data		
Ethernet interface			
Baud rate	10/100 MBaud half-duplex or full-duplex (2)		
AS-i			
AS-i specification	3.0		
Cycle time	150 µs * (number of slaves + 2)		
Operating voltage	30 V_{DC} (20 ... 31,6 V) (PELV voltage)		
AS-i Power24V capability (1)	yes		
AUX			
Operating voltage	24 V_{DC} (19,2 ... 28,8 V)		
Max current consumption	1 A	7,2 A	
Display			
LCD	indication of slave 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 AS-i (green)	AS-i voltage o.k.		
LED AS-i active (green)	AS-i 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	

Article no.	BWU2579	BWU2742	BWU3542 BWU3543 BWU3544
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.		
c**TÜV**us	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.		
Standards	EN 60529 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, PLe		
Environment			
Operating altitude	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) **AS-i 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) 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.

Article no.	BWU2579	BWU2742 / BWU3542 / BWU3543 / BWU3544
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)

Article no.	BWU2579	BWU2742 / BWU3542 / BWU3543 / BWU3544
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 µs), continuously 4 mA at 24 V	15 mA (T = 100 µs), continuously 4 mA at 24 V
Power supply	out of AS-i	out of AUX
Sensor supply	short-circuit and overload protected according to EN 61131-2	
Tolerated test pulse	–	adjustable
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, ∑ = 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.

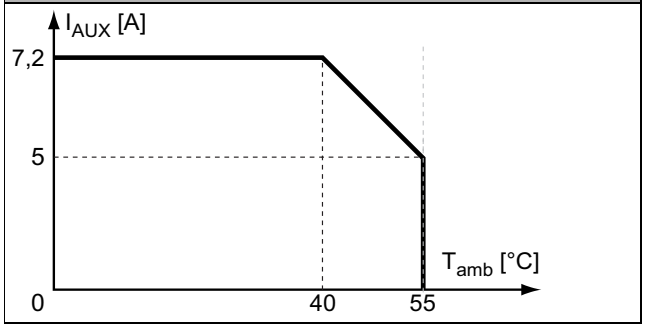
(3) connection only at terminals SO1 ... SO6 configured as standard inputs (see “Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3544”)

(4) loop resistance ≤150 Ω

(5) see “Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3544”

(6)

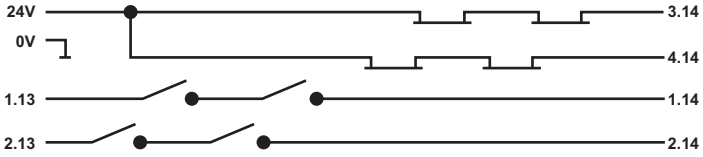
BWU2742, BWU3542, BWU3543, BWU3544
Derating output current



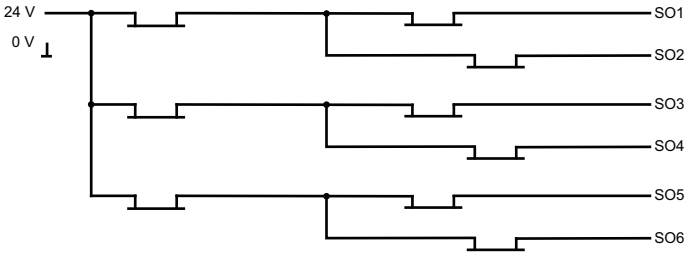
Article no.	Operating current		
	master power supply, approx 300 mA out of AS-i network	master power supply, max. 300 mA out of AS-i circuit 1 (approx. 70 mA ... 300 mA), max. 300 mA out of AS-i circuit 2 (approx. 70 mA ... 300 mA); in sum max. 370 mA	Version „1 Gateway, 1 power supply for 2 AS-i circuits“, ca. 350 mA (PELV voltage)
BWU2579	–	–	•
BWU2742	–	–	•
BWU3542	–	–	•
BWU3543	–	–	•
BWU3544	–	•	–

	BWU3544	BWU2579 / BWU2742 / BWU3542 / BWU3543
Redundant power supply out of AS-i: all fundamental functions of the device remain available even in case of power failure in one of the two AS-i networks	●	–
Current measurement of the AS-i circuits	–	●
Self-resetting adjustable fuses	–	●
AS-i earth fault monitor distinguishes between AS-i cable and sensor cable	–	●
In version „1 gateway, 1 power supply for 2 AS-i circuits“: only 1 gateway + 1 AS-i power supply is needed for both 2 AS-i circuits	–	●

Safety outputs block diagram BWU2579:



Safety outputs block diagram BWU2742, BWU3542, BWU3543, BWU3544:



Variations of terminal configuration for BWU2742, BWU3542, BWU3543, BWU3544

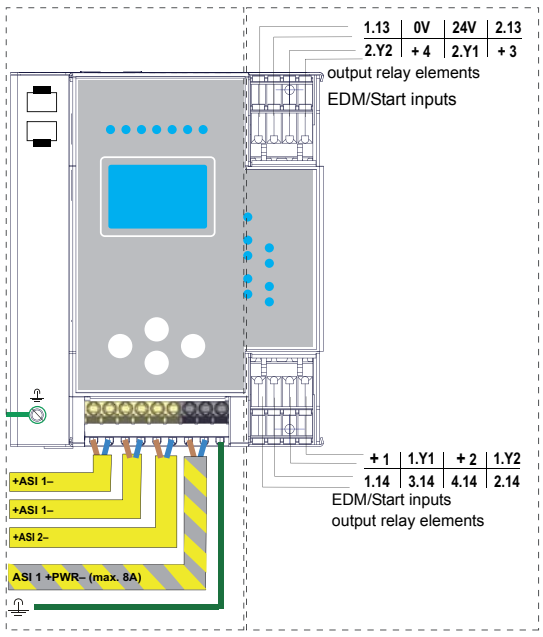
Terminal	Safe output	Safe input for mechanical contacts in combination with T1, T2 (1)	Safe antivalent input (1)	Safe electronic input (1)	Standard input (1)
SI1,2	–	●	●	●	●
SI3,4	–	●	●	●	●
SI5,6	–	●	●	●	●
SO1,2 (2)	●	●	●	–	●
SO3,4 (2)	●	●	●	–	●
SO5,6 (2)	●	●	●	–	●

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

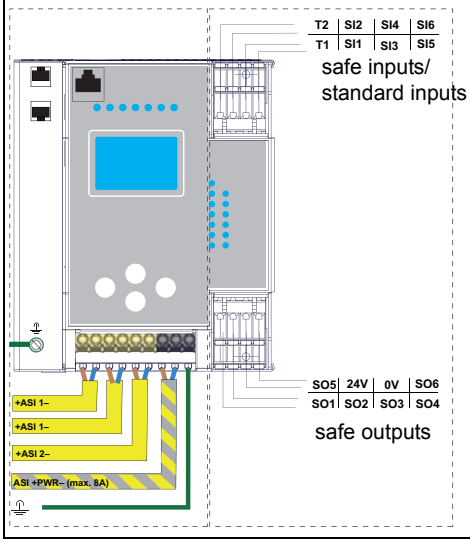
(2) If outputs are configured as inputs, the input current has to be limited by an external element at ≤ 100 mA.

Connections: Gateway + Safety Monitor:

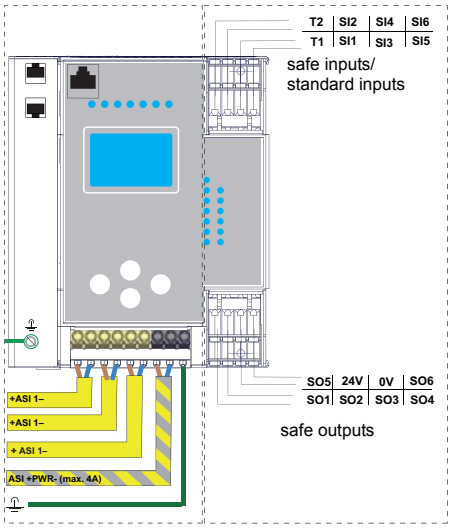
BWU2579

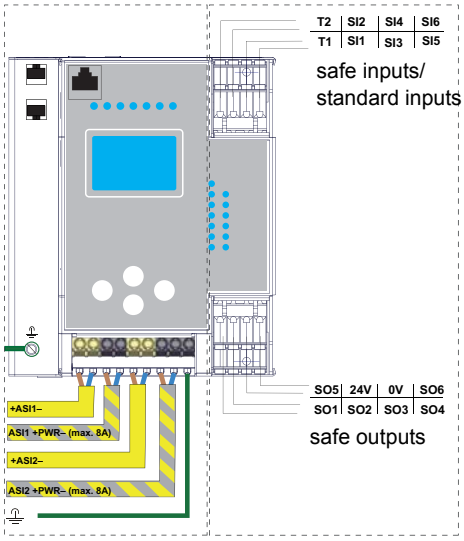


BWU2742, BWU3543



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 AS-i circuits
ASI +PWR-	Power supply for Gateway and AS-i 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 AS-i circuit
	ASI +PWR-	Power supply for Gateway and AS-i networks

BWU3544	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 AS-i circuit
	ASI1 +PWR-, ASI2 +PWR-	Power supply for Gateway and AS-i 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.: AS-i power supply, 4 A (art. no. BW1649), AS-i power supply, 8 A (art. no. BW1997) (further power supply units can be found at *www.bihl-wiedemann.de/en/products/accessories/power-supplies*)**