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

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data

(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, 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	**BWU2821**
	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	**BWU3079**
	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	**BWU2818**

(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).

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

Article no.	BWU2818 BWU2821 BWU3079
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	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 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.
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

Article no.	BWU2818 BWU2821 BWU3079
Environment	
Operating altitude	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 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) BWU2821 from Ident. No. ≥16483, Ident. No. <16483 10 MBaud half-duplex.
BWU3079 from Ident. No. ≥16069, Ident. No. <16069 10 MBaud half-duplex.
BWU2818, BWU2742: 10 MBaud half-duplex.

Article no.	BWU2818 / BWU2821 / BWU3079
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
Tolerated test pulse	adjustable
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
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.

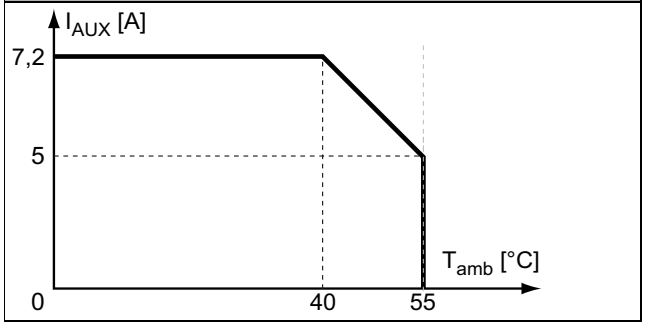
(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see “Variations of terminal configuration for BWU2818, BWU2821, BWU3079”)

(3) loop resistance ≤150 Ω

(4) see “Variations of terminal configuration for BWU2818, BWU2821, BWU3079”

(5)

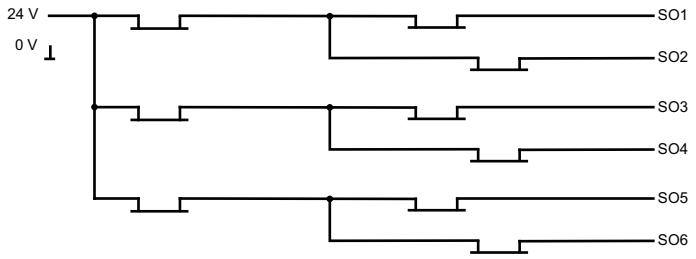
BWU2818, BWU2821, BWU3079
Derating output current



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)
BWU2818	–	–	•
BWU2821	–	–	•
BWU3079	–	•	–

	BWU3079	BWU2818 / BWU2821
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
BWU2818, BWU2821, BWU3079:



Variations of terminal configuration for BWU2818, BWU2821, BWU3079

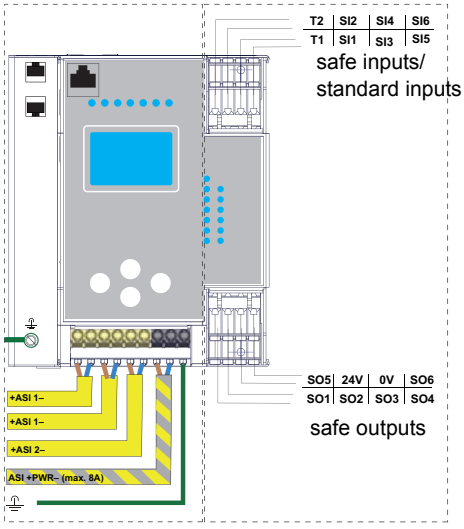
Terminal	Safe output	Safe input for mechanical contacts in combination with T1, T2 (1)	Safe antivalent input (1)	Safe electronic input (1)	Standard input (1)
SI1,2	–	●	●	●	●
SI3,4	–	●	●	●	●
SI5,6	–	●	●	●	●
SO1,2 (2)	●	●	●	–	●
SO3,4 (2)	●	●	●	–	●
SO5,6 (2)	●	●	●	–	●

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

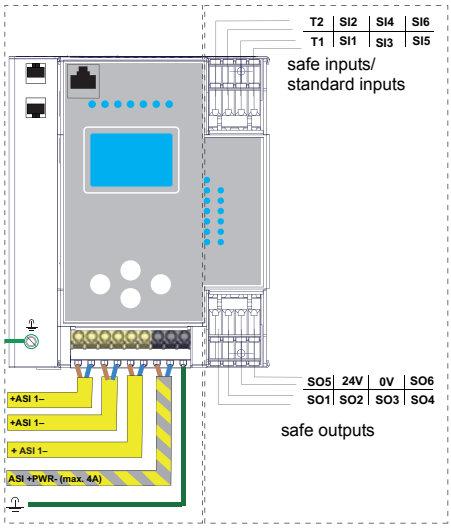
(2) If outputs are configured as inputs, the input current has to be limited by an external element at ≤ 100 mA.

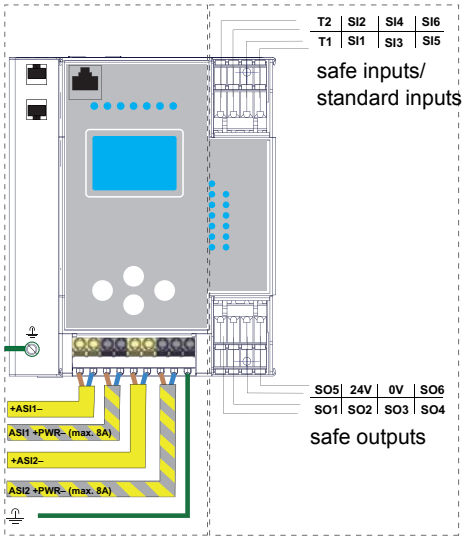
Connections: Gateway + Safety Monitor:

BWU2821



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

BWU2818	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

BWU3079	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*)**