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 and ASi-3 Safety

CIP Safety™ (1) over EtherNet/IP™ (1) and Safe Link in one device

1 ASi-5/ASi-3 master, EtherNet/IP + 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

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

Chip card for storage of configuration data

(figure similar)

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

Figure	Interface, fieldbus	Safety communication	Inputs Safety (1)	Outputs Safety, SIL 3, cat. 4	ASi Safety	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, OPC UA	CIP Safety over EtherNet/IP + Safe Link	6 x 1 channel or 3 x 2 channels	6 release circuits; 6 x electronic safe outputs	ASi-5 Safety + ASi-3 Safety compatible	1 ASi network, 1 ASi-5/ASi-3 Master	yes, max. 4 A/ASi network	Ethernet fieldbus, Ethernet diagnostic	**BWU4006**

(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.

(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.	BWU4006
Fieldbus interface	
Type	Ethernet + Modbus TCP acc. to IEEE 802.3 2 x RJ-45, integrated 2-Port-Switch
Baud rate	10/100 MBaud
IT interface	OPC UA server, web server, REST API
Safety communication	CIP Safety over EtherNet/IP + Safe Link
Variably configurable Assembly Objects	yes
Function	Device Level Ring (DLR) (Ethernet/IP only)
Card slot	chip card (BW4785) 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
IT interface	OPC UA server, web server, REST API
Safety communication	Safe Link
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 and ASi-3 Safety compatible
Operating voltage	30 V_{DC} (20 ... 31,6 V) (PELV voltage)
Operating current	300 mA
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 V_{DC} 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.

Article no.	BWU4006
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.

Article no.	BWU4006
Safety monitor	
ASi Safety	ASi-5 Safety 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 (1)
Speed monitors for local inputs	3 to 6 axes, up to 400 Hz (2)
Selection of Mode of Safe Operation	yes
Connection	
Connection	Push-in terminals
Length of connector cable	unlimited (3)
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) (4)
Inputs digital, EDM	up to 12 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 release circuits; 6 x electronic safe outputs
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.

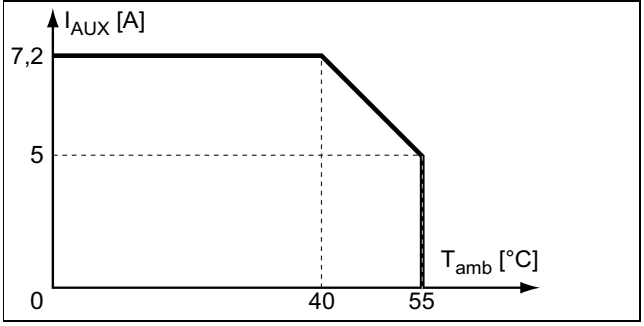
(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see “Variations of terminal configuration for BWU4006”)

(3) loop resistance ≤150 Ω

(4) see “Variations of terminal configuration for BWU4006”

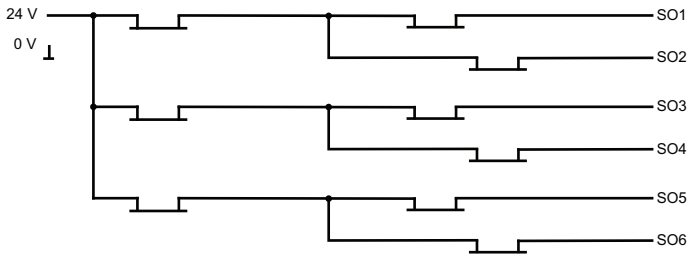
(5)

BWU4006
Derating output current



	BWU4006
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 BWU4006:



Variations of terminal configuration for BWU4006

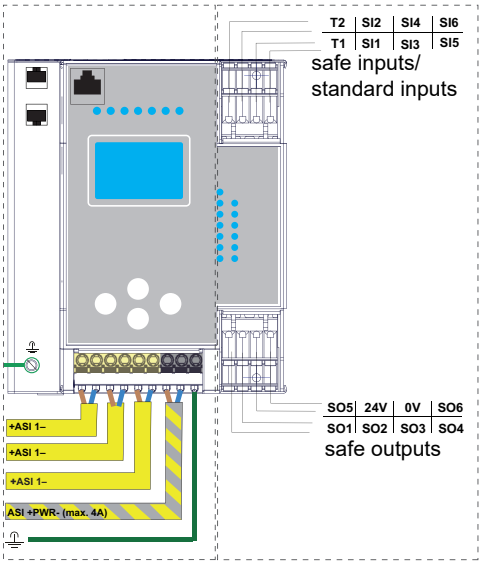
Terminal	up to 6 safe outputs	up to 6 safe 2 channel inputs for floating contacts in combination with T1, T2 (1)	up to 6 safe 2 channel inputs for antivalent switches (1)	up to 3 safe 2 channel inputs for OSSDs	up to 12 safe 1 channel inputs (1)	up to 12 standard inputs (1)
SI1	–	•	•	•	•	•
SI2	–				•	•
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:

BWU4006



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 circuits
ASI +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, memory capacity ≥16 GB (art. no. BW4785)**
- **Bihl+Wiedemann Safety 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*)**