

ASi-5/ASi-3 EtherCAT Gateway with integrated Safety Monitor

ASi-5 – Great data bandwidth, short cycle times

Compatible with all ASi generations

ASi-5 master and ASi-3 master in one device

Safety communication over Safe Link

1 ASi Master, EtherCAT-Device

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 server and integrated web server for simplified diagnostics

Selection of Mode of Safe Operation

Safe speed and standstill monitoring

Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data



(figure similar)



| Figure | Type | Inputs Safety, SIL 3, cat. 4 | Inputs Safety, expandable to | Outputs Safety, SIL 3, cat. 4 | Safety outputs, independent according to SIL 3, expandable to | Safety communication | Number of ASi networks, number of ASi Master ⁽¹⁾ | 1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies ⁽²⁾ | Diagnostic and configuration interface ⁽³⁾ | Art. no. |
|--------|--------------------------------|------------------------------|---|---|---|----------------------|---|---|---|----------------|
| | Safety EtherCAT, ASi-5 / ASi-3 | 3 x 2 channels | max. 31 x 2 channels, max. 1891 in max. configuration | 6 release circuits; 6 x electronic safe outputs | max. 64, max. 1984 in max. configuration | Safe Link | 1 ASi network, 1 ASi Master | yes, max. 4 A/ASi network | Ethernet diagnostic | BWU3991 |

⁽¹⁾ **Number of ASi networks, number of ASi Master**
"Single Master": 1 ASi network, 1 ASi Master.

⁽²⁾ **1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies**
"yes, max. 4 A/ASi network": 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.

⁽³⁾ **Diagnostic and configuration interface**
"Ethernet diagnostic": Access to ASi master and safety monitor via Bihl+Wiedemann proprietary software over Ethernet diagnostics interface.

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

ASi-5/ASi-3 EtherCAT Gateway with integrated Safety Monitor

| | |
|--|--|
| Article no. | BWU3991 |
| Fieldbus interface | |
| EtherCAT | RJ-45 acc. IEEE 802.3 |
| OPC UA interface | OPC UA server + web server |
| Baud rates | 100 MBaud |
| Card slot | chip card (512 KB) for storage of configuration data |
| Ethernet interface | |
| Baud rate | 100 MBaud full-duplex |
| Safety communication | Safe Link |
| Safe coupling ⁽¹⁾ | – |
| ASi | |
| ASi specification | ASi-3 + ASi-5 |
| Cycle time | Cycle time ASi-3 (variable): 150 µs * (number of ASi-3 nodes + 2) Cycle time ASi-5 (constant): 1,27 ms for 384 bits input data + 384 bits output data |
| 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 |
| Display | |
| LCD | menu, indication of ASi addresses and error messages in plain text |
| LED power (green) | power on |
| LED ect run (green) | EtherCAT communication 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) | 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 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. |

ASi-5/ASi-3 EtherCAT Gateway with integrated Safety Monitor

| | |
|--|---|
| Article no. | BWU3991 |
| Environment | |
| Standards | EN 60529 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, PL _e |
| 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) 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.

| | |
|---|---|
| Article no. | BWU3991 |
| 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, $\Sigma = 7,2$ 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 |

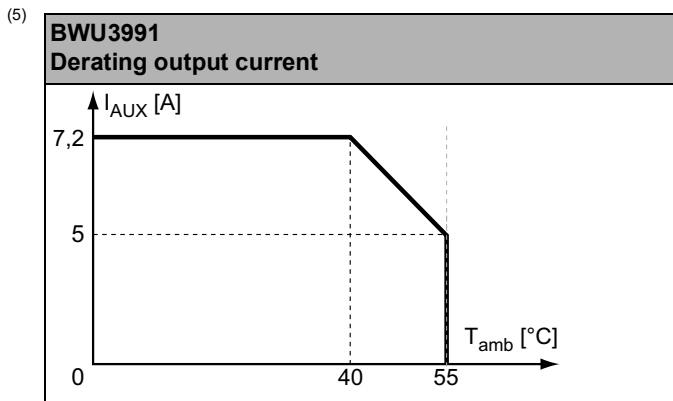
(1) connection at all SI or SO terminals possible.

(2) connection only at terminals SO1 ... SO6 configured as standard inputs (see "Variations of terminal configuration for BWU3991")

(3) loop resistance ≤150 Ω

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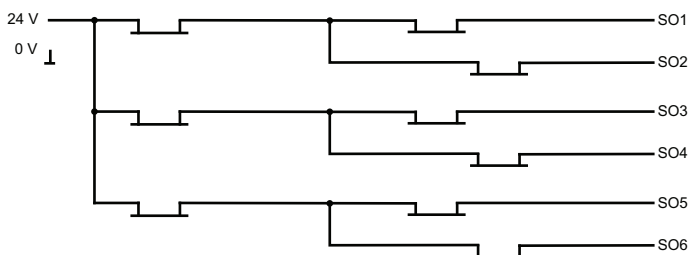
(4) see "Variations of terminal configuration for BWU3991"



| 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 | Version „1 Gateway, 1 power supply for 2 ASi circuits“, ca. 300 mA (PELV voltage) |
| BWU3991 | - | - | • |

| | BWU3991 |
|--|---------|
| 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 | • |
| In version „1 gateway, 1 power supply for 2 ASi circuits“: only 1 gateway + 1 ASi power supply is needed for both 2 ASi circuits | • |

Safety outputs block diagram BWU3991:



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Variations of terminal configuration for BWU3991

| 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:

| BWU3991 | 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 512 kB (art. no. BW4055)
- 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)