

# ASi-3 PROFINET Gateways with integrated Safety Monitor

## ASi-3 PROFINET Gateways with integrated Safety Monitor

2 / 1 Master, PROFINET device

Up to 32 release circuits

- up to 6 safe output circuits on the Monitor safe 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

1 Safety Monitor for 2 ASi networks

- Operation using a single Monitor configuration!  
Monitor processes safety slaves on two ASi networks
- Coupling between the two networks superfluous

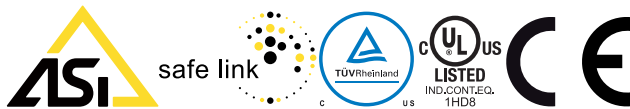
Safe speed and standstill monitoring



Applications up to category 4/PLe/SIL 3

Chip card for storage of configuration data



(Figure similar)



| Figure  | Type             | Inputs safety, 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 <sup>(1)</sup> | 1 power supply, 1 gateway for 2 ASi networks, inexpensive power supplies <sup>(2)</sup> | Diagnostic and configuration interface <sup>(3)</sup> | Article No.    |
|---|------------------|---|--|---|----------------------|---|---|---|----------------|
|  | Safety, PROFINET | max. 62 x 2 channels, max. 1922 in max. configuration | 6 release circuits; 6 x electronic safe outputs            | max. 32, max. 992 in max. configuration                       | Safe Link            | 2 ASi networks, 2 ASi Masters                               | yes, max. 4 A/ ASi network  | Ethernet fieldbus; Ethernet diagnostics               | <b>BWU2828</b> |
|   | Safety, PROFINET | max. 62 x 2 channels, max. 1922 in max. configuration | 6 release circuits; 6 x electronic safe outputs            | max. 32, max. 992 in max. configuration                       | Safe Link            | 2 ASi networks, 2 ASi Masters                               | no, max. 8 A/ ASi network, redundant supply   | Ethernet fieldbus; Ethernet diagnostics               | <b>BWU3080</b> |
|  | Safety, PROFINET | max. 31 x 2 channels, max. 1891 in max. configuration | 6 release circuits; 6 x electronic safe outputs            | max. 31, max. 991 in max. configuration                       | Safe Link            | 1 ASi network, 1 ASi Master                                 | yes, max. 4 A/ ASi network  | Ethernet fieldbus; Ethernet diagnostics               | <b>BWU2798</b> |
|   | Safety, PROFINET | max. 62 x 2 channels, max. 1922 in max. configuration | 4 release circuits; 2 x relay, 2 x electronic safe outputs | max. 32, max. 992 in max. configuration                       | Safe Link            | 2 ASi networks, 2 ASi Masters                               | yes, max. 4 A/ ASi network  | Ethernet fieldbus + RS 232                            | <b>BWU2642</b> |

(1) **Number of ASi networks, number of ASi Master**

"Single Master": 1 ASi network, 1 ASi Master.

"Double Master": 2 ASi networks, 2 ASi Masters.

(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).

"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.

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### (3) Diagnostic and configuration interface

**"Ethernet fieldbus + Ethernet diagnostic"**: Access to ASi master and safety monitor via Bihl+Wiedemann proprietary software over Ethernet diagnostics interface or Ethernet fieldbus interface.

**"Ethernet fieldbus + RS 232"**: Access to ASi master and safety monitor via Bihl+Wiedemann proprietary software over Ethernet fieldbus interface or RS 232 interface and adapter cable.

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

| Article no.                                      | BWU2642  | BWU2798 / BWU2828 | BWU3080                                      |
|--|--|-------------------|--|
| <b>Interface</b>                                 |  |                   |  |
| PROFINET interface                               | 2 x RJ-45, integrated 2-Port-Switch, IRT capability                    |                   |  |
| Conformance Class                                | Class B<br>integrated switch complies with Class C (IRT capability)    |                   |  |
| Baud rates                                       | 10/100 MBaud   |                   |  |
| Function   | PROFINET IO Device<br>Media Redundancy Protocol (MRP)<br>Shared Device |                   |  |
| Card slot  | Chip card for storage of configuration data                            |                   |  |
| <b>ASi</b>                                       |  |                   |  |
| ASi specification                                | 3.0  |                   |  |
| Cycle time                                       | 150 $\mu$ s * (number of slaves + 2)                                   |                   |  |
| Operating voltage                                | 30 V <sub>DC</sub> (20 ... 31,6 V) (PELV voltage)                      |                   |  |
| ASi Power24V capability <sup>(1)</sup>           | yes  |                   | no   |
| <b>AUX</b>                                       |  |                   |  |
| Operating voltage                                | 24 V <sub>DC</sub> (19,2 ... 28,8 V)                                   |                   |  |
| Max current consumption                          | 1 A  |                   | 7,2 A  |
| <b>Display</b>                                   |  |                   |  |
| LCD  | indication of slave addresses and error messages in plain text         |                   |  |
| LED power (green)                                | power on   |                   |  |
| LED PROFINET (green/red)                         | green: PROFINET communication active<br>red: no PROFINET communication |                   |  |
| LED config error (red)                           | configuration error  |                   |  |
| LED U ASi (green)                                | ASi voltage OK   |                   |  |
| 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 (yellow)                                 | auxiliary power  |                   |  |
| LEDs 1.Y1, 1.Y2, 2.Y1, 2.Y2 (EDM/Start) (yellow) | state of inputs:<br>off: open<br>on: closed                            |                   | –  |
| LEDs K1 ... K4 (green)                           | state of outputs:<br>off: open<br>on: closed                           |                   | –  |
| LEDs SI1 ... SI6 (yellow)                        | –  |                   | state of inputs:<br>off: open<br>on: closed  |
| LEDs SO1 ... SO6 (yellow)                        | –  |                   | state of outputs:<br>off: open<br>on: closed |

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| Article no.   | BWU2642  | BWU2798 / BWU2828 | BWU3080 |
|---|--|-------------------|---------|
| <b>UL-specifications (UL508)</b>                      |  |                   |         |
| External protection                                   | An isolated source with a secondary open circuit voltage of $\leq 30 V_{DC}$ has to be protected with a 3 A maximum over current. 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.  |                   |         |
| cTÜVus  | the device BWU2642 from Bihl+Wiedemann GmbH is safety certified by TÜV Rheinland of North America, Inc. according to UL-standards and meets the safety requirements for the North American market.           |                   |         |
| Applied standards                                     | EN 60529<br>EN 61000-6-2<br>EN 61000-6-4<br>EN 62061, SIL 3<br>EN 61508, SIL 3<br>EN ISO 13849-1, Performance-Level e  |                   |         |
| <b>Ambient</b>  |  |                   |         |
| Ambient temperature                                   | 0 °C ... +55 °C  |                   |         |
| Storage temperature                                   | -25 °C ... +85 °C  |                   |         |
| Operating altitude                                    | max. 2000 m  |                   |         |
| Housing   | stainless steel, for DIN-rail mounting   |                   |         |
| Protection category                                   | IP20   |                   |         |
| Tolerable loading referring to impacts and vibrations | according EN 61131-2   |                   |         |
| Voltage of insulation                                 | $\geq 500$ V   |                   |         |
| Weight  | 800 g  |                   |         |
| Dimensions (W / H / D in mm)                          | 109 / 120 / 96   | 109 / 120 / 106   |         |

(1) **ASi Power24V**

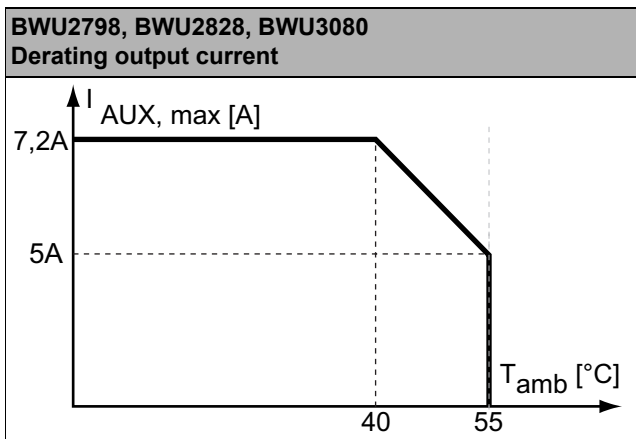
The device can be operated directly on a 24 V (PELV) power supply. The gateway has been optimized with integrated data coupling coils and adjustable self-resetting fuses for safe use of powerful 24 V power supplies.

| Article no.                          | BWU2642  | BWU2798 / BWU2828 / BWU3080                        |
|--------------------------------------|--|--|
| <b>Safety Monitor</b>                |  |  |
| Start delay                          | < 10 ms  |  |
| Max. turn-off time                   | < 40 ms  |  |
| Antivalent switches for local inputs | –  | yes  |
| Standstill monitors for local inputs | –  | 6 axes<br>up to 50 Hz <sup>(2)</sup>               |
| Speed monitors for local inputs      | –  | 3 to 6 axes<br>up to 400 Hz <sup>(3)</sup>         |
| <b>Connection</b>                    |  |  |
| Connection                           | COMBICON   |  |
| Length of connector cable            | I/O: max. 15 m                                     | unlimited <sup>(4)</sup>                           |
| <b>Input</b>                         |  |  |
| Inputs Safety, SIL3, cat. 4          | –  | 3 x 2 channels <sup>(5)</sup>                      |
| Inputs digital, EDM                  | 4  | up to 6 standard inputs <sup>(5)</sup>             |
| Switching current                    | 30 mA (T = 100 $\mu$ s), continuously 4 mA at 24 V | 15 mA (T = 100 $\mu$ s), continuously 4 mA at 24 V |
| Power supply                         | out of ASi   | out of AUX   |

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| Article no.                               | BWU2642   | BWU2798 / BWU2828 / BWU3080  |
|---|---|--|
| <b>Output</b>                             |   |  |
| Number of release circuits on the monitor | 4   | 6  |
| Outputs                                   | relay outputs (output circuits 1 and 2)<br>max. contact load <sup>(1)</sup> :<br>3 A <sub>AC-15</sub> at 30 V, 3 A <sub>DC-13</sub> at 30 V<br>semiconductor outputs (output circuits 3 and 4)<br>max. contact load: 0,5 A <sub>DC-13</sub> at 30 V | semiconductor output<br>max. contact load:<br>1,2 A <sub>DC-13</sub> at 30 V, $\Sigma = 7,2$ A in sum <sup>(6)</sup> |
| Power supply (semiconductor outputs)      | out of AUX  |  |
| Test pulse (semiconductor outputs)        | if output is on:<br>minimum interval between 2 test pulses:<br>250 ms (as from Safety Version 4.3);<br>maximum pulse width 1,5 ms   | if output is on:<br>minimum interval between<br>2 test pulses: 250 ms;<br>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 BWU2798, BWU2828, BWU3080")
- (4) loop resistance  $\leq 150 \Omega$
- (5) see "Variations of terminal configuration for BWU2798, BWU2828, BWU3080"
- (6)



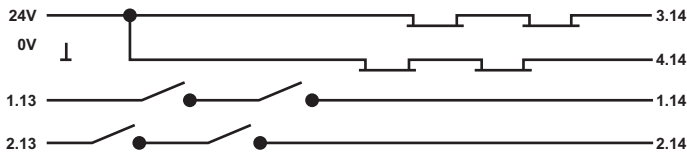
| Article no. | Operating current                                   |   |  |
|-------------|---|---|--|
|             | Master power supply, ca. 300 mA out of ASi circuits | Master power supply, max. 300 mA out of ASi circuit 1 (approx. 70 mA ... 300 mA), max. 300 mA out of ASi circuit 2 (approx. 70 mA ... 300 mA); in sum max. 370 mA | Version „1 gateway, 1 power supply, for 2 ASi networks“, approx. 300 mA (PELV voltage) |
| BWU2642     | -   | -   | •  |
| BWU2798     | -   | -   | •  |
| BWU2828     | -   | -   | •  |
| BWU3080     | -   | •   | -  |

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|   | BWU3080 | BWU2642 /<br>BWU2798 /<br>BWU2828 |
|---|---------|-----------------------------------|
| Redundant power supply out of ASi:<br>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“:<br>only 1 gateway + 1 ASi power supply is needed for both 2 ASi circuits                         | -       | •                                 |

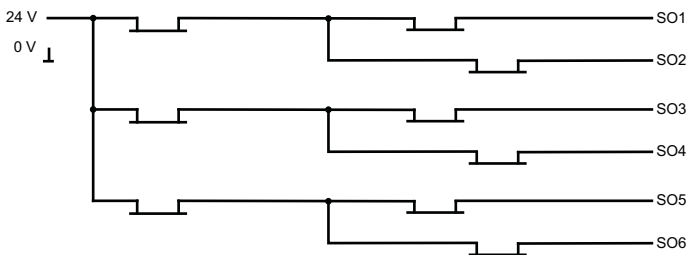
### Safety outputs block diagram

#### BWU2642:



### Safety outputs block diagram

#### BWU2798, BWU2828, BWU3080



### Variations of terminal configuration for

#### BWU2798, BWU2828, BWU3080

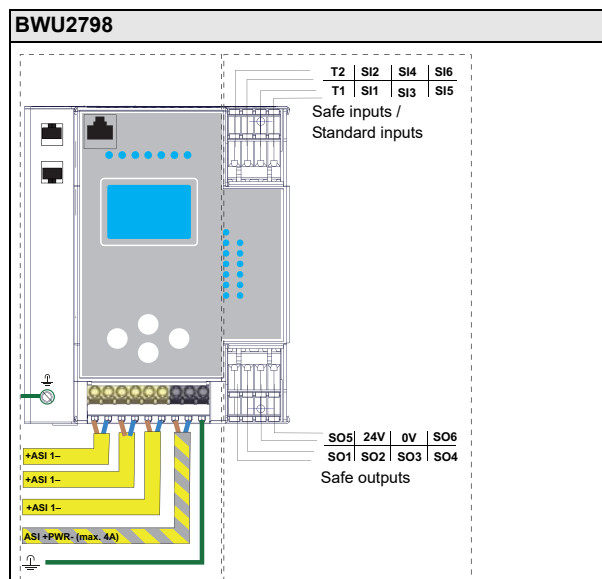
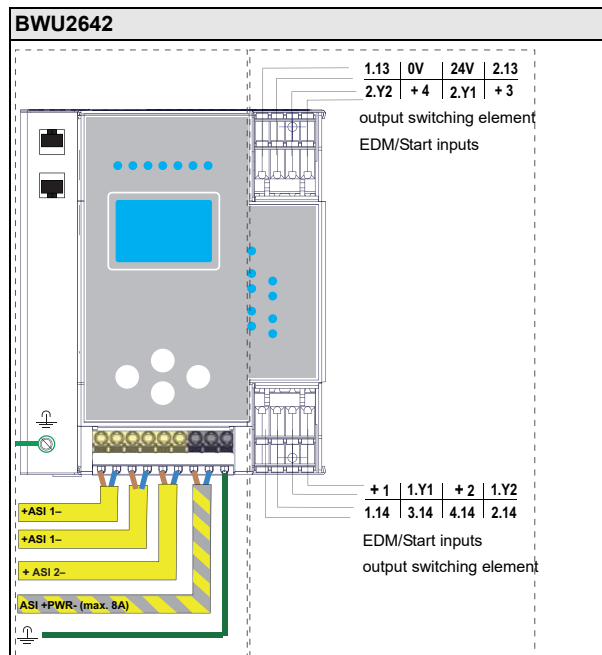
| Terminal             | Safe output | Safe input for mechanical contacts in combination with T1, T2 <sup>(1)</sup> | Safe antivalent input <sup>(1)</sup> | Safe electronic input <sup>(1)</sup> | Standard input <sup>(1)</sup> |
|----------------------|-------------|--|--------------------------------------|--------------------------------------|-------------------------------|
| SI1,2                | -           | •  | •                                    | •                                    | •                             |
| SI3,4                | -           | •  | •                                    | •                                    | •                             |
| SI5,6                | -           | •  | •                                    | •                                    | •                             |
| SO1,2 <sup>(2)</sup> | •           | •  | •                                    | -                                    | •                             |
| SO3,4 <sup>(2)</sup> | •           | •  | •                                    | -                                    | •                             |
| SO5,6 <sup>(2)</sup> | •           | •  | •                                    | -                                    | •                             |

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

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

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## Connections: Gateway + Safety Monitor:



| 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 |

# ASi-3 PROFINET Gateways with integrated Safety Monitor

| BWU2828 | 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 |  |
|         |                  |   |  |
|         |                  |   |  |

| BWU3080 | 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        |  |
|         | 24V, 0V                | Power supply for local I/Os               |  |
|         | +ASi 1-, +ASi 2-       | Connection of ASi circuits                |  |
|         | ASi1 +PWR-, ASi2 +PWR- | Power supply for Gateway and ASi networks |  |
|         |                        |   |  |
|         |                        |   |  |

**Accessories:**

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- PROFINET Master Simulator (art. no. BW3057)
- Bihl+Wiedemann Suite - Safety Software for Configuration, Diagnostics and Commissioning (art. no. BW2916)
- Power supplies, e.g.: ASi power supply, 4 A (art. no. BW1649), ASi power supply, 8 A (art. no. BW1997) (further power supply units can be found at [www.bihl-wiedemann.de/en/products/accessories/power-supplies](http://www.bihl-wiedemann.de/en/products/accessories/power-supplies))



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