

# AS-i 3.0 Gateways, PROFIsafe via PROFIBUS or PROFINET

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### PROFIsafe and Safe Link in one device

- up to 450 devices

### 2 / 1 Master, PROFINET / PROFIBUS Slave

- AS-i Safety input slaves report via PROFIsafe
- AS-i Safety output slaves switch via PROFIsafe

### Up to 64 release circuits

- up to 6 safe output circuits CAT4, SIL 3 on the Monitor safe 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

### 1 Safety Monitor for 2 AS-i networks

- Operation using a single Monitor configuration!  
Monitor processes safety slaves on two AS-i 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, 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 AS-i networks, number of AS-i Master <sup>(1)</sup>	1 power supply, 1 gateway for 2 AS-i networks, inexpensive power supplies <sup>(2)</sup>	Diagnostic and configuration interface <sup>(3)</sup>	Article No.
	PROFIsafe, PROFIBUS	3 x 2 channels	max. 31 x 2-kanalig,	6 release circuits; 6 x fast electronic safe outputs	max. 31	PROFIsafe (F-CPU) + ASIMON program	1 AS-i network, 1 AS-i Masters	yes, max. 4A/ AS-i network	Ethernet diagnostics	<b>BWU2819</b>
	PROFIsafe, PROFIBUS	—	max. 62 x 2 channels	4 release circuits; 2 x relay, 2 x fast electronic safe outputs	max. 16	PROFIsafe (F-CPU) + ASIMON program	2 AS-i networks, 2 AS-i Masters	yes, max. 4A/ AS-i network	Ethernet diagnostics	<b>BWU2615</b>
	PROFIsafe, PROFIBUS	—	max. 62 x 2 channels	4 release circuits; 2 x relay, 2 x fast electronic safe outputs	max. 16	PROFIsafe (F-CPU) + ASIMON program	2 AS-i networks, 1 AS-i Master	yes, max. 4A/ AS-i network	Ethernet diagnostics	<b>BWU2598</b>
	PROFIsafe, PROFIBUS	—	max. 31 x 2 channels	—	max. 16	PROFIsafe (F-CPU)	1 AS-i network, 1 AS-i Masters	yes, max. 4A/ AS-i network	RS 232	<b>BWU2479</b>

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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 AS-i networks, number of AS-i Master <sup>(1)</sup>	1 power supply, 1 gateway for 2 AS-i networks, inexpensive power supplies <sup>(2)</sup>	Diagnostic and configuration interface <sup>(3)</sup>	Article No.
	PROFIsafe, PROFINET	3 x 2 channels	max. 62 x 2 channels, 1922 in max. configuration	6 release circuits; 6 x fast electronic safe outputs	max. 64, 1984 in max. configuration	PROFIsafe (F-CPU) + ASIMON program + Safe Link	2 AS-i networks, 2 AS-i Masters	yes, max. 4A/ AS-i network	Ethernet fieldbus; Ethernet diagnostics	BWU3367
	PROFIsafe, PROFINET	3 x 2 channels	max. 31 x 2 channels	6 release circuits; 6 x fast electronic safe outputs	max. 31	PROFIsafe (F-CPU) + ASIMON program	1 AS-i network, 1 AS-i Masters	yes, max. 4A/ AS-i network	Ethernet fieldbus; Ethernet diagnostics	BWU2794
	PROFIsafe, PROFINET	–	max. 62 x 2 channels	4 release circuits; 2 x relay, 2 x fast electronic safe outputs	max. 16	PROFIsafe (F-CPU) + ASIMON program	2 AS-i networks, 2 AS-i Masters	yes, max. 4A/ AS-i network	RS 232 + Ethernet fieldbus	BWU2647
	PROFIsafe, PROFINET	–	max. 62 x 2 channels	–	max. 16	PROFIsafe (F-CPU) + ASIMON program	2 AS-i networks, 2 AS-i Masters	yes, max. 4A/ AS-i network	Ethernet fieldbus; Ethernet diagnostics	BWU2805

(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.

**"Optional AS-i Safety coupling circuit"**: 2 AS-i networks, 1 AS-i Master.

(2) **1 power supply, 1 gateway for 2 AS-i networks, inexpensive power supplies**

**"yes, max. 4A/AS-i network"**: Cost-effective power for 2 AS-i networks with 1 power supply.

(3) **Diagnostic and configuration interface**

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

**"Ethernet diagnostic"**: Access to AS-i master and safety monitor via Bihl+Wiedemann proprietary software over Ethernet diagnostics interface.

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

**"RS 232"**: Access to AS-i master and safety monitor via Bihl+Wiedemann proprietary software over RS 232 interface and adapter cable.

**The latest version of the device description file of the gateway with integrated safety monitor is available in the "Downloads" section of the respective device.**

Article no.	BWU2479	BWU2598	BWU2615	BWU2819	BWU2647	BWU2805	BWU2794 / BWU3367
<b>Interface</b>							
<b>Fieldbus interface</b>	<b>PROFIBUS (RS 485)</b>				<b>PROFINET (RJ-45)</b>		
	acc. to IEC 61158 / IEC 61784-1				<ul style="list-style-type: none"> <li>2 x RJ-45, integrated 2-Port-Switch IRT capability                             <ul style="list-style-type: none"> <li>Conformance Class B</li> <li>integrated switch complies with Conformance Class C (IRT capability)</li> </ul> </li> </ul>		
Baud rates	9,6 Kbaud ... 12000 Kbaud, automatic recognition				10/100 Mbaud		
Function	DP function: <ul style="list-style-type: none"> <li>imaging of the AS-i Slaves as I/O of the PROFIBUS</li> <li>complete diagnosis and configuration via the DP Master</li> </ul>				<ul style="list-style-type: none"> <li>PROFINET IO Device</li> <li>Media Redundancy Protocol (MRP)                             <ul style="list-style-type: none"> <li>Shared Device</li> </ul> </li> </ul>		
Card slot	chip card for storage of configuration data						
<b>AS-i</b>							
AS-i specification	3.0						
Cycle time	150 µs * (number of slaves + 2)						
Operating voltage	30 V <sub>DC</sub> (20 ... 31,6 V) (PELV voltage)						
AS-i Power24V capability <sup>(1)</sup>	no				yes		

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Article no.	BWU2479	BWU2598	BWU2615	BWU2819	BWU2647	BWU2805	BWU2794 / BWU3367
<b>AUX</b>							
Operating voltage	–	24 V <sub>DC</sub> (19,2 ... 28,8 V)				–	24 V <sub>DC</sub> (19,2 ... 28,8 V)
Max current consumption	–	1 A	7,2 A	1 A	–	7,2 A	
<b>Display</b>							
LCD	indication of slave addresses and error messages in plain text						
LED PROFINET (green / red)	–				green: PROFINET communication active red: no PROFINET communication		
LED PROFIBUS (green)	PROFIBUS communication active				–		
LED power (green)	power on						
LED config error (red)	configuration error						
LED U AS-i (green)	AS-i voltage OK						
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				–	auxiliary power
LEDs 1.Y1, 1.Y2, 2.Y1, 2.Y2 (EDM/Start) (yellow)	–	state of inputs: off: open on: close	–	state of inputs: off: open on: close	–		
LEDs K1 ... K4 (green)	–	state of outputs: off: open on: close	–	state of outputs: off: open on: close	–		
LEDs SI1 ... SI6 (yellow)	–		state of inputs: off: open on: close	–		state of inputs: off: open on: close	
LEDs SO1 ... SO6 (yellow)	–		state of outputs: off: open on: close	–		state of outputs: off: open on: close	
<b>UL-specifications (UL508)</b>							
External protection	An isolated source with a secondary open circuit voltage of ≤30 V <sub>DC</sub> 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.						
cTÜV <sub>us</sub>	the devices • BWU2479 • BWU2598 • BWU2615 • BWU2647 from Bihl + Wiedemann GmbH were safety certified by TÜV Rheinland of North America, Inc. according to UL-standards and meet the safety requirements for the North American market.						
Applied standards	EN 60529 EN 62026-2 EN 61000-6-2 EN 61000-6-4 EN 62061, SIL 3 EN 61508, SIL 3 EN ISO 13849-1, Performance-Level e EN ISO 13849-2						

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Article no.	BWU2479	BWU2598	BWU2615	BWU2819	BWU2647	BWU2805	BWU2794 / BWU3367
<b>Environment</b>							
Operating altitude	max. 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 EN 61131-2						
Voltage of insulation	≥ 500 V						
Weight	800 g						
Dimensions (B / H / T in mm)	75 / 120 / 96	100 / 120 / 106			109 / 120 / 96	85 / 120 / 106	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.

Article no.	BWU2479 / BWU2805	BWU2598 / BWU2615 / BWU2647	BWU2794 / BWU2819 / BWU3367
<b>Safety monitor</b>			
Start delay	–	< 10 s	
Max. turn-off time	< 40 s		
Antivalent switches for local inputs	–		yes
Standstill monitors for local inputs	–		6 axes up to 50 Hz <sup>(2)</sup>
Speed monitors for local inputs	–		3 to 6 axes 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	–		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 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
Tolerated test pulse	–		adjustable
<b>Output</b>			
Number of release circuits on the monitor	–	4	6
Outputs	–	relay outputs (output circuits 1 and 2) max. contact load <sup>(1)</sup> : 3 A <sub>AC-15</sub> at 30 V, 3 A <sub>DC-13</sub> at 30 V	semiconductor output max. contact load: 1,2 A <sub>DC-13</sub> at 30 V, Σ = 7,2 A in sum <sup>(6)</sup>
	–	semiconductor outputs (output circuits 3 and 4) max. contact load: 0,5 A <sub>DC-13</sub> at 30 V	
Power supply (semiconductor outputs)	–	out of AUX	
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 ms	if output is on: minimum interval between 2 test pulses: 250 ms; maximum pulse width 1 ms

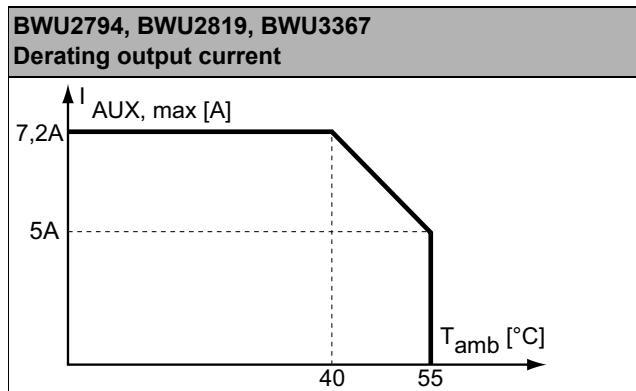
(1) Protection via external fuse, max. 4 A semi time-lag.

(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 BWU2794, BWU2819, BWU3367")

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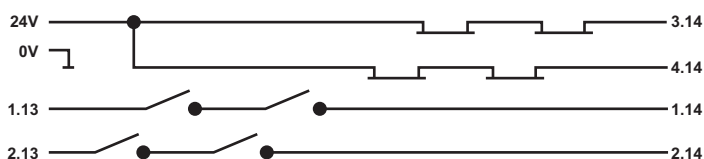
- (4) loop resistance  $\leq 150 \Omega$   
 (5) see "Variations of terminal configuration for BWU2794, BWU2819, BWU3367"  
 (6)



Article no.	Operating current		
	Master power supply, ca. 300 mA out of AS-i circuits	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 networks“, approx. 300 mA (PELV voltage)
BWU2479	•	-	-
BWU2598	-	•	-
BWU2615	-	-	•
BWU2647	-	-	•
BWU2794	-	-	•
BWU2805	-	-	•
BWU2819	-	-	•
BWU3367	-	-	•

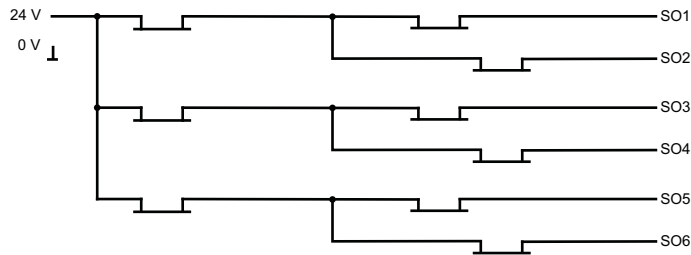
	BWU2479 / BWU2598	BWU2615 / BWU2647 / BWU2794 / BWU2805 / BWU2819 / BWU3367
Redundant power supply out of AS-i: all fundamental functions of the device remain available even in case of power failure in one of the two AS-i networks	-	-
Current measurement of the AS-i circuits	-	•
Self-resetting adjustable 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 BWU2598, BWU2615, BWU2647:



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## Safety outputs block diagram BWU2794, BWU2819, BWU3367



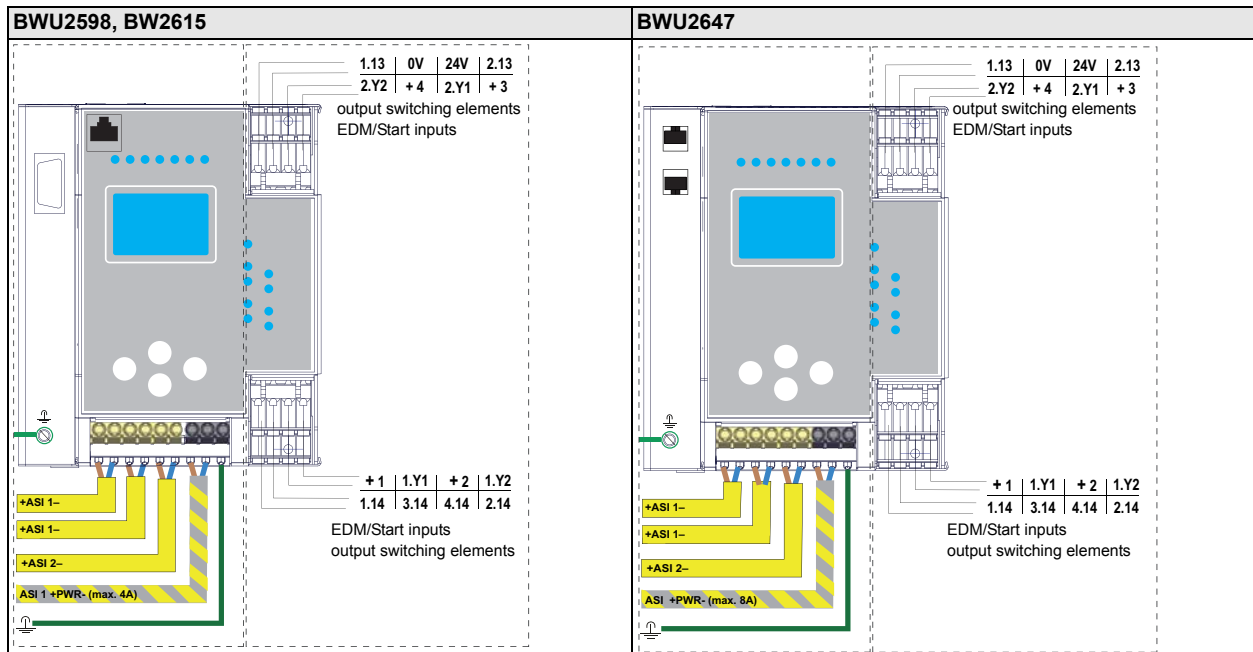
## Variations of terminal configuration for BWU2794, BWU2819, BWU3367

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>	•	•	•	–	•

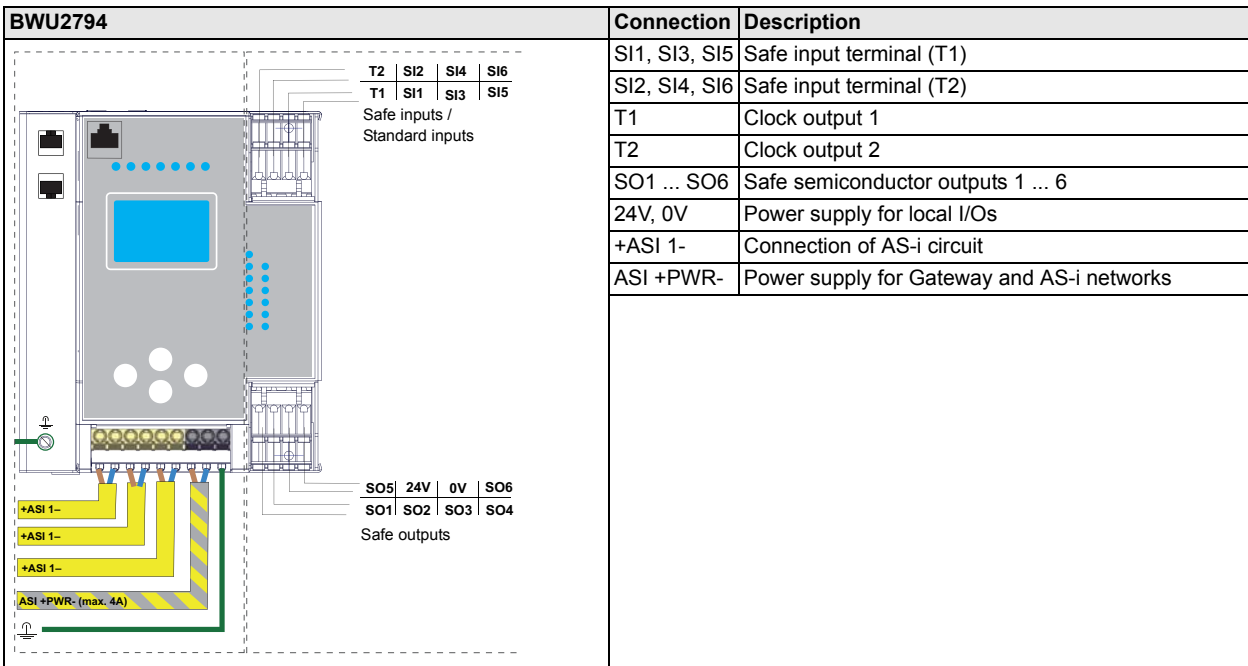
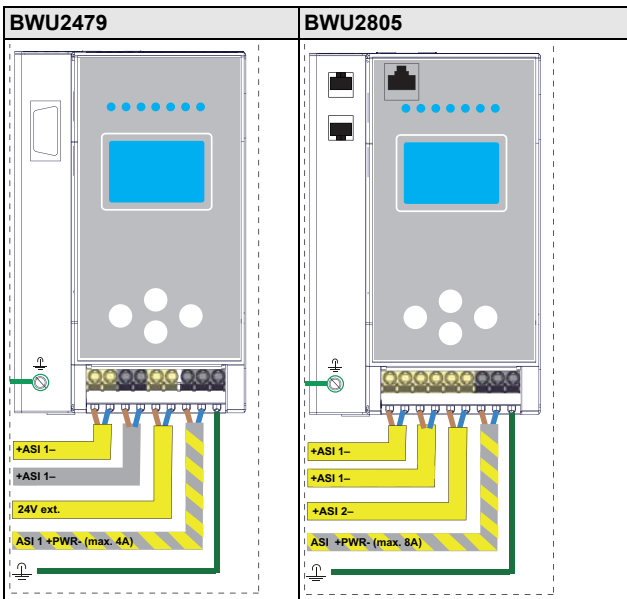
(1) Inputs may only be supplied by the same 24 V source as the device itself.

(2) If outputs are configured as inputs, the input current has to be limited by an external element at  $\leq 100\text{mA}$

## Connections: Gateway + Safety Monitor:



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BWU2819	Connection	Description																
<p> <table border="1"> <tr><td>T2</td><td>SI2</td><td>SI4</td><td>SI6</td></tr> <tr><td>T1</td><td>SI1</td><td>SI3</td><td>SI5</td></tr> </table>                       Safe inputs / Standard inputs                 </p> <p> <table border="1"> <tr><td>SO5</td><td>24V</td><td>0V</td><td>SO6</td></tr> <tr><td>SO1</td><td>SO2</td><td>SO3</td><td>SO4</td></tr> </table>                       Safe outputs                 </p> <p>                     +ASI 1-                      +ASI 1-                      +ASI 1-                      +ASI +PWR- (max. 4A)                 </p>	T2	SI2	SI4	SI6	T1	SI1	SI3	SI5	SO5	24V	0V	SO6	SO1	SO2	SO3	SO4	SI1, SI3, SI5	Safe input terminal (T1)
	T2	SI2	SI4	SI6														
	T1	SI1	SI3	SI5														
	SO5	24V	0V	SO6														
	SO1	SO2	SO3	SO4														
	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-	Connection of AS-i circuit																	
ASI +PWR-	Power supply for Gateway and AS-i networks																	

BWU3367	Connection	Description																
<p> <table border="1"> <tr><td>T2</td><td>SI2</td><td>SI4</td><td>SI6</td></tr> <tr><td>T1</td><td>SI1</td><td>SI3</td><td>SI5</td></tr> </table>                       Safe inputs / Standard inputs                 </p> <p> <table border="1"> <tr><td>SO5</td><td>24V</td><td>0V</td><td>SO6</td></tr> <tr><td>SO1</td><td>SO2</td><td>SO3</td><td>SO4</td></tr> </table>                       Safe outputs                 </p> <p>                     +ASI 1-                      +ASI 1-                      +ASI 2-                      +ASI +PWR- (max. 8A)                 </p>	T2	SI2	SI4	SI6	T1	SI1	SI3	SI5	SO5	24V	0V	SO6	SO1	SO2	SO3	SO4	SI1, SI3, SI5	Safe input terminal (T1)
	T2	SI2	SI4	SI6														
	T1	SI1	SI3	SI5														
	SO5	24V	0V	SO6														
	SO1	SO2	SO3	SO4														
	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 AS-i circuits																	
ASI +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](http://www.bihl-wiedemann.de/en/products/accessories/power-supplies))

## For devices with PROFIBUS interface:

- Serial PROFIBUS Master (art. no. BW1258)
- PROFIBUS-DP Master simulator (art. no. BW1257)

## For devices with PROFINET interface:

- PROFINET Master simulator Plus (art. no. BW3057)