

ASi-5 Safety Input Module

4 x 1-channel safe inputs or 2 x 2-channel safe inputs for

- 2 x floating contacts or
- 2 x OSSDs or
- 1 x floating contacts and 1 x OSSD

up to 8 standard inputs, depending on configuration

up to 8 standard outputs, depending on configuration

Module width of 22.5 mm,
for optimum use of control cabinet space

protection category IP20



(Figure similar)



Figure	Type	Inputs Safety ⁽¹⁾	Safety signal inputs	Inputs digital	Outputs digital	Input voltage (sensor supply) ⁽²⁾	Output voltage (actuator supply) ⁽³⁾	ASi connection ⁽⁴⁾	ASi address ⁽⁵⁾	Article no.
	IP20, 22.5 mm x 114 mm, 6 x 4 contacts, ASi-5 Safety	4 x 1-channel or 2 x 2-channels	floating contacts	up to 8, depending on configuration	up to 8 x electronic, depending on configuration	out of AUX	out of AUX	ASi via profile cable	1 ASi-5 address	BWU4186
	IP20, 22.5 mm x 114 mm, 6 x 4 contacts, ASi-5 Safety	4 x 1-channel or 2 x 2-channels	OSSDs	up to 8, depending on configuration	up to 8 x electronic, depending on configuration	out of AUX	out of AUX	ASi via profile cable	1 ASi-5 address	BWU4187
	IP20, 22.5 mm x 114 mm, 6 x 4 contacts, ASi-5 Safety	4 x 1-channel or 2 x 2-channels	floating contacts + OSSDs	up to 8, depending on configuration	up to 8 x electronic, depending on configuration	out of AUX	out of AUX	ASi via profile cable	1 ASi-5 address	BWU4188

(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/PL/SIL3.

(2) Input voltage (sensor supply): inputs are supplied by ASi or by AUX (auxiliary 24 V power). If supplied by ASi, inputs shall not be connected to earth or to external potential.

(3) Output voltage (actuator supply): outputs are supplied by ASi or by AUX (auxiliary 24 V power). If supplied by ASi, outputs shall not be connected to earth or to external potential

(4) ASi connection: the connection to ASi as well to AUX (auxiliary 24V power) is either made via yellow resp. black ASi profile cable with piercing technology or via M12 socket (in IP20 via clamps).

(5) ASi address: 1 AB address (max. 62 AB addresses/ASi network), 2 AB addresses (max. 31 modules with 2 AB addresses), Single addresses (max. 31 Single addresses/ASi network), mixed use allowed.

Article no.		BWU4186	BWU4188	BWU4187
Connection				
ASi/AUX connection		Push-in terminals		
Periphery connection		Push-in terminals		
Length of connector cable		I/O: max. 15 m ⁽¹⁾		
ASi				
Adresse		1 ASi-5 address		
Required ASi specification of the Master		ASi-5		
Operating voltage		30 V _{DC} (18 ... 31,6 V)		
Max. current consumption		100 mA		
Max. current consumption without sensor/actuator supply		100 mA		
AUX				
Voltage		24 V _{DC} (20 ... 30 V) (PELV) ⁽²⁾		
Max. current consumption		3 A max.		
Input				
Number		up to 8, depending on configuration		
Power supply		out of AUX		
Sensor supply		short-circuit and overload protected, acc. to EN 61131-2		
Supply of attached sensors	up to +40 °C	200 mA per input, Σ (In) 1500 mA ⁽³⁾		
	at +55 °C			
	at +70 °C	200 mA per input, Σ (In) 750 mA ⁽³⁾		
Switching threshold		U<5 V (low) U>15 V (high)		
Output				
Number		up to 8 x electronic, depending on configuration		
Power supply		out of AUX		
Output		short-circuit and overload protected, acc. to EN 61131-2		
Max. output current	up to +40 °C	350 mA per output, Σ (Out) 1500 mA ⁽⁴⁾		
	at +55 °C			
	at +70 °C	350 mA per output, Σ (Out) 750 mA ⁽⁴⁾		
Safety input				
Number		4 x 1-channel safe inputs (SIL1, cat. 2, PLc) or 2 x 2-channel safe inputs (SIL3, cat. 4, PLe)		
Safety signal		floating contacts	1 x floating contacts + 1 x OSSDs	OSSDs
Power supply		out of AUX		
Switching current		15 mA (T = 100µs), continuously 4 mA at 24 V		–
Max. output current for OSSD supply		–	Σ(In/Out)<320 mA	
OSSD test pulses		–	0 ... 50 Hz	
OSSD test pulse width		–	U _{aux} ≥ 21,5 V= 0 ... 1 ms test pulses possible U _{aux} ≥17 V= 0 ... 0,8 ms test pulses possible U _{aux} <17 V= 0 ... 0,6 ms	
Input level		10 mA, R < 150 Ω	for floating contacts: 10 mA, R < 150 Ω for OSSDs: Vin > 11 V for High-Level, input current> 2 mA at 15 V	Vin > 11 V for High-Level, input current> 2 mA at 15 V

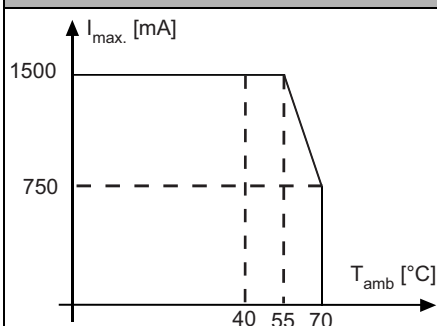
Article no.	BWU4186	BWU4188	BWU4187
Display			
LED ASi (green)	on: ASi voltage on flashing: ASi voltage on, but peripheral fault ⁽⁵⁾ or address 0 off: no ASi voltage		
LED FLT/FAULT (red)	on: ASi address 0 or ASi node offline flashing: peripheral fault ⁽⁵⁾ off: ASi node online		
LED AUX (green)	on: 24 V _{DC} AUX off: no 24 V _{DC} AUX		
LEDs I/O1 ... I/On (green/red)	state of inputs I1 ... I8 or outputs O1 ... O8, depending on configuration off: corresponding input or output is turned off yellow: the corresponding input or output is turned on red flashing: output short circuit ⁽⁵⁾ at the corresponding output red: overload sensor supply ⁽⁵⁾ at the corresponding input		
LEDs S11, S12, S21, S22 (yellow)	state of safe 2-channel inputs S11/S12 (SI1), S21/S22 (SI2) ⁽⁶⁾		
Environment			
Applied standards	EN 61000-2 EN 61000-3 EN 61131-2 EN 62061 EN ISO 13849-1 EN 60529		
It can be used with a switched AUX cable, which is passively safe up to SIL3/PLe	no ⁽⁷⁾		
Operating altitude	max. 2000 m		
Ambient operating temperature	-30 °C ... +55 °C (up to max. +70 °C) ⁽⁸⁾		
Storage temperature	-25 °C ... +85 °C		
Housing	plastic, for screw mounting		
Pollution Degree	2		
Protection category	IP20		
Tolerable loading referring to humidity	according to EN 61131-2		
Voltage of insulation	≥500 V		
Weight	125 g		
Dimension (W / H / D in mm)	22.5 / 99 / 114		

(1) loop resistance ≤150 Ω

(2) The ground connection of the 24 V power supply, which supplies auxiliary power (AUX), must be grounded!

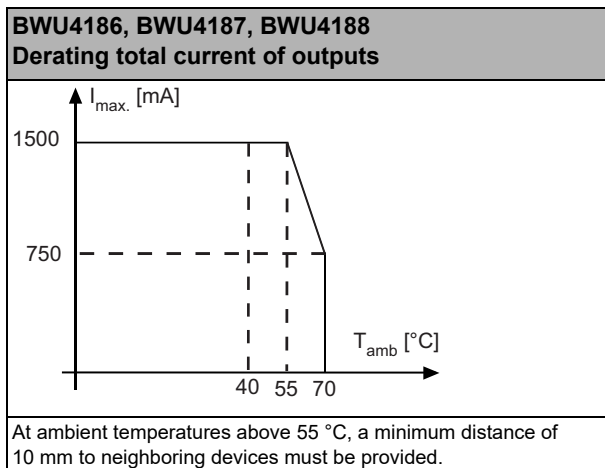
(3)

BWU4186, BWU4187, BWU4188 Derating total current of inputs



At ambient temperatures above 55 °C, a minimum distance of 10 mm to neighboring devices must be provided.

(4)



- (5) See table "Peripheral fault indication"
- (6) When the ASi communication is off (ASi LED is off), the actual state of the safe input may vary from the displayed LED status.
- (7) The module is not suitable for use in paths with a passively safe-switched AUX cable, since an exclusion of errors cannot be assumed for the connection of the two ASi and AUX potentials.
If the module is supplied from an unswitched AUX cable, this has no influence on the safety consideration for the paths with passively safe-switched AUX cable. In an ASi circuit, paths supplied from a passively safe-switched AUX cable and paths supplied from unswitched AUX potential can be used together.
- (8) Maximum ambient operating temperature +55 °C according UL certificate for the use in the USA and Canada.

Wiring rules

	Push-in terminals, 2 /3 /4 poles (pitch 5 mm)
General	
Nominal cross section	2.5 mm ²
Conductor cross section	
Conductor cross section solid	0.2 ... 2.5 mm ²
Conductor cross section flexible	0.2 ... 2.5 mm ²
Conductor cross section flexible, with ferrule	without plastic sleeve: 0.25 ... 2.5 mm ²
	with plastic sleeve: 0.25 ... 2.5 mm ²
2 conductors with same cross section, stranded, with TWIN ferrules	without plastic sleeve: 0.5 ... 1.5 mm ²
AWG	24 ... 14
Stripped insulation length	10 mm

UL specifications (UL508) BWU4186, BWU4187, BWU4188	
External protection	An isolated source with a secondary open circuit voltage of .30 VDC 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.

Article no.	Peripheral fault indication				
	Overload sensor supply	Output short circuited	Cross connection	Output overload	AUX voltage missing
BWU4186	•	•	•	•	•
BWU4187	•	•	—	•	•
BWU4188	•	•	•	•	•

Programming: ASi bit assingment

Article no.	Byte	Bit							
		D7	D6	D5	D4	D3	D2	D1	D0
		Input							
BWU4186	0	reserved				S22	S21	S12	S11
	1	I8	I7	I6	I5	I4	I3	I2	I1
	2	Diagnostics S21/S22 ⁽¹⁾				Diagnostics S11/S12 ⁽³⁾			
	3	Diagnostics S22 ⁽²⁾				Diagnostics S12 ⁽²⁾			
BWU4187	0	reserved				OSSD4 (S22)	OSSD3 (S21)	OSSD2 (S12)	OSSD1 (S11)
	1	I8	I7	I6	I5	I4	I3	I2	I1
	2	Diagnostics S21/S22 ⁽¹⁾				Diagnostics S11/S12 ⁽³⁾			
	3	Diagnostics S22 ⁽²⁾				Diagnostics S12 ⁽²⁾			
BWU4188	0	reserved				OSSD2 (S22)	OSSD1 (S21)	S12	S11
	1	I8	I7	I6	I5	I4	I3	I2	I1
	2	Diagnostics S21/S22 ⁽¹⁾				Diagnostics S11/S12 ⁽³⁾			
	3	Diagnostics S22 ⁽²⁾				Diagnostics S12 ⁽²⁾			

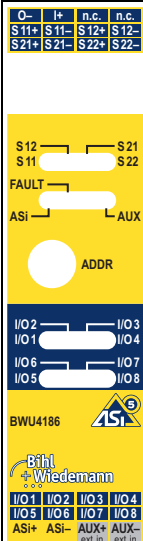
(1) S21 only if configured as a 1-channel safe input

(2) Only if configured as a 1-channel safe input

(3) S11 only if configured as a 1-channel safe input

Article no.	Byte	Bit							
		D7	D6	D5	D4	D3	D2	D1	D0
		Output							
BWU4186	0	reserved							
	1	O8	O7	O6	O5	O4	O3	O2	O1
BWU4187	0	reserved					Reset 2	reserved	Reset 1
	1	O8	O7	O6	O5	O4	O3	O2	O1
BWU4188	0	reserved					Reset 2	reserved	
	1	O8	O7	O6	O5	O4	O3	O2	O1

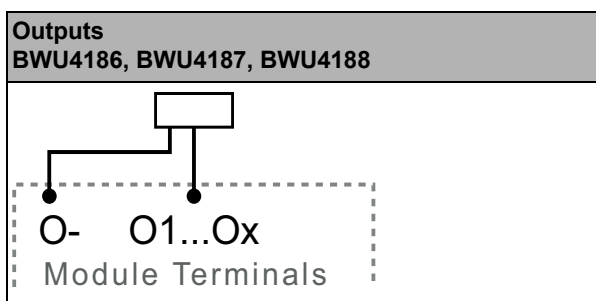
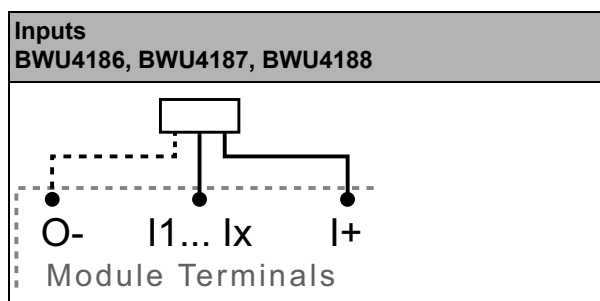
Pin assignment

BWU4186	Terminals	Description
	Sx1+/Sx1-, Sx2+/Sx2-	safe 2-channel input x for floating contacts
	I/Ox	either digital input x or digital output x, freely configurable
	I+	sensor supply
	O-	reference potential for outputs
	ASi+, ASi-	connection to ASi bus
	AUX+ _{ext.in} , AUX- _{ext.in}	power supply, out of external voltage (AUX)
	n.c. (not connected)	not connected
	ADDR	connection for ASi-5 addressing device

BWU4187	Terminals	Description
	Sx1/Sx2	safe 2-channel input x for OSSDs
	0 V _{ext out} , 24 V _{ext out}	power supply for OSSDs x
	RST x (reset)	reset signal for safe input x
	I/Ox	either digital input x or digital output x, freely configurable
	I+	sensor supply
	O-	reference potential for outputs
	ASi+, ASi	connection to ASi bus
	AUX+ _{ext.in} , AUX- _{ext.in}	power supply, out of external voltage (AUX)
	n.c. (not connected)	not connected
	ADDR	connection for ASi-5 addressing device

BWU4188	Terminals	Description
	S11+/S11-, S12+/S12-	safe 2-channel input 1 for floating contacts
	S21, S22	safe 2-channel input 2 for OSSDs
	0 V _{ext out} , 24 V _{ext out}	power supply for OSSDs on safe input 2
	RST x (reset)	reset signal for safe input 2
	I/Ox	either digital input x or digital output x, freely configurable
	I+	sensor supply
	O-	reference potential for outputs
	ASi+, ASi	connection to ASi bus
	AUX+ _{ext.in} , AUX- _{ext.in}	power supply, out of external voltage (AUX)
	n.c. (not connected)	not connected
	ADDR	connection for ASi-5 addressing device

Power supply (PNP) via the Module



	Note
	The inputs need to be supplied out of AUX+!

Accessories:

- Bihl-Wiedemann Suite - Safety Software for Configuration, Diagnostics and Programming (art. no. BW2916)
- ASi-5/ASi-3 Address Programming Device (art. no. BW4925)