Bihl+Wiedemann

ASi Safety I/O Module

Up to 8 x 2 channels safe inputs for:
- floating contacts
- complementary switches
- OSSDs
- complementary OSSDs
- adjustable test puls width

resp. as standard inputs

1 release circuit (1 x electronic safe output)
- augmented reliability

Optimal costs for safety in- and outputs on ASi

Module width of 22.5 mm,
for optimal use of space in the service cabinet

Universal module for as many use cases,
optimized for service and commissioning

Protection category IP20

(figure similar)

Figure	Type	Inputs Safety, SIL 3, cat. 4	Outputs Safety, SIL 3, cat. 4	Safety signal inputs	Input voltage (sensor supply.) [1]	Output voltage (actuator supply.) [2]	ASi address [3]	Article no.
	IP20, 22,5 mm x 114 mm, 6 x 4 contacts, Safety	8 x 2 channels	1 release circuit; 1 x electronic safe outputs augmented reliability	floating contacts, complementary switches, OSSDs, complementary OSSDs	out of AUX	out of AUX	depending on configuration, optimized for ASIMON360	BWU3428

[1] **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.

[2] **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

[3] **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.
For modules with two ASi nodes the second ASi node is turned off as long as the first ASi node is addressed to address "0".
Upon request, ASi nodes are available with specific ASi address profiles.

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Article no.	BWU3428
Connection	
ASi / AUX connection	push-in terminals
Periphery connection	push-in terminals
Length of connector cable	unlimited [1]
ASi	
Profile	safety ASi input nodes: S-0.B.0 (ID1=F, default)
	ASi diagnostic nodes: S-7.A.E (ID1=5, default)
	4I/4O node: S-7.F.E (ID1=F, default) [2]
	ASi configuration node: S-7.A.5 (ID1=7, default)
Address	depending on configuration
Required Master profile	≥M3
Since ASi specification	2.1
Voltage	30 V_{DC} (18 ... 31,6 V)
Max. current consumption	200 mA
Max. continuous operating current	125 mA
AUX	
Voltage	24 V_{DC} (20 ... 30 V)
Max. current consumption	1 A
Input	
Number	up to 8 x 2 channels safe inputs [3]
	up to 16 standard inputs [2] [3]
Supply voltage inputs	out of AUX
Sensor supply	short-circuit and overload protected per EN 61131
Max. current for sensor supply	0,7 A
Safety Signal	floating contacts or complementary switches, OSSDs resp. complementary OSSDs [3] [4]
Switching current	15 mA (T = 100 µs), continuously 4 mA at 24 V
Switching threshold	<5 V (low)
	>15 V (high)
OSSD test pulses	0 ... 50 Hz
OSSD test pulse width	0 ... 51 ms, adjustable
Clock outputs for floating contacts / antivalent switches	1 test pulse per clock output per second, pulse duration approx. 1 ms
Output	
Number	1 release circuit (1 x fast electronic safe output) [3]
Max. contact load:	0,7 A DC-13 at 24 V
Supply voltage outputs	out of AUX
Output	short-circuit and overload protected per EN 61131
Test pulse	when output is switched on
	minimal distance between 2 test pulses: 250 ms, pulse length up to 1 ms
Visualization	
LED ASI (green)	ASi power supply on
LED FAULT (red)	on: no data exchange or adress 0
	flashing: peripheral error
LED AUX (green)	on: 24 V_{DC} AUX
	off: no 24 V_{DC} AUX
LEDs S1 ... Sn (yellow)	state of input S1 ... S16
LED SO1 (yellow)	output 1 has switched

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Article no.	BWU3428
Environment	
Applied standards	EN 60529 IEC 61508 SIL 3 EN 62061 SIL 3 EN ISO 13849-1 PLe cat. 4
It can be used with a switched AUX cable, which is passively safe up to SIL3/PLe	yes [5]
Ambient temperature	0 °C ... +55 °C
Storage temperature	-25 °C ... +85 °C
Housing	plastic, for DIN-rail mounting
Protection class	IP20
Tolerable loading referring to humidity	according to EN 6131-2
Voltage of insulation	≥ 500 V
Weight	160 g
Dimensions (W / H / D in mm)	22,5 / 99 / 114,5

[1]   loop resistance ≤ 150 Ω

[2]   BWU3428: emulated standard address from Ident. ≥ID20940.

[3]   see "Configuration options of connections"

[4]   BWU3428: complementary OSSDs from Ident. ≥ID20940.

[5]   The module is suitable for use in paths with a passively safe-switched AUX cable, since an exclusion of errors can be assumed for the connection of the two ASi and AUX potentials.

UL-specifications (UL508) BWU3428	
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.

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

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Terminal assignment BWU3428

BWU3428	Signal name	Description	
	S1, S2	connection 2 channel safe input 1 (SI1)	configurable for floating contacts (float.cont.), antivalent switches (antiv.sw.), OSSDs, antivalent OSSDs or as standard input (standard.in)
	S3, S4	connection 2 channel safe input 2 (SI2)	
	S5, S6	connection 2 channel safe input 3 (SI3)	
	S7, S8	connection 2 channel safe input 4 (SI4)	
	S9, S10	connection 2 channel safe input 5 (SI5)	
	S11, S12	connection 2 channel safe input 6 (SI6)	
	S13, S14	connection 2 channel safe input 7 (SI7)	
	S15, S16	connection 2 channel safe input 8 (SI8)	
	Ix	standard input x	
	Ox	standard output x	
	SOx	safe electronic output x	
	T1	clock output 1 (S1, S3, S5, S7, S9, S11, S13, S15)	
	T2	clock output 2 (S2, S4, S6, S8, S10, S12, S14, S16)	
	$24\,V_{ext.out}$	power supply, out of external 24 V, positive pole (AUX)	
	$0\,V_{ext.out}$	power supply, out of external 24 V, negative pole (AUX)	
	$24\,V_{out\,of\,ASi}$	power supply, out of ASi, positive pole	
	$0\,V_{out\,of\,ASi}$	power supply, out of ASi, negative pole	
	$1.14_{ext.out}$	semiconductor output 1	
	$0\,V_{ext.out}$	mass connection for semiconductor output 1	
	ADDR	addressing socket	
	ASi+, ASi-	connection to ASi Bus	
	AUX $+_{ext.in}$, AUX $-_{ext.in}$	connection for power supply, out of external 24 V (AUX)	
	NC	normally closed contact	
	NO	normally open contact	
	CHIP CARD	chip card slot	
	n.c.	not connected	
	d.n.c.	do not connect	

Configuration options of connections

BWU3428				
Function/ configuration	**terminal assignment**			
SI1, SI2	**S4**	**S3**	**S2**	**S1**
float. cont.	NC (T2)	NC (T1)	NC (T2)	NC (T1)
antiv.sw.	NO (T2)	NC (T1)	NO (T2)	NC (T1)
OSSD	NC (OSSD4)	NC (OSSD3)	NC (OSSD2)	NC (OSSD1)
antiv.OSSD [1]	NO (OSSD4)	NC (OSSD3)	NO (OSSD2)	NC (OSSD1)
standard.in [2]	I4	I3	I2	I1
SI3, SI4	**S8**	**S7**	**S6**	**S5**
float. cont.	NC (T2)	NC (T1)	NC (T2)	NC (T1)
antiv.sw.	NO (T2)	NC (T1)	NO (T2)	NC (T1)
OSSD	NC (OSSD8)	NC (OSSD7)	NC (OSSD6)	NC (OSSD5)
antiv.OSSD [1]	NO (OSSD8)	NC (OSSD7)	NO (OSSD6)	NC (OSSD5)
standard.in [2]	I8	I7	I6	I5

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BWU3428				
Function/ configuration	**terminal assignment**			
SI5, SI6	**S12**	**S11**	**S10**	**S9**
float. cont.	NC (T2)	NC (T1)	NC (T2)	NC (T1)
antiv.sw.	NO (T2)	NC (T1)	NO (T2)	NC (T1)
OSSD	NC (OSSD12)	NC (OSSD11)	NC (OSSD10)	NC (OSSD9)
antiv.OSSD [1]	NO (OSSD12)	NC (OSSD11)	NO (OSSD10)	NC (OSSD9)
standard.in [2]	I12	I11	I10	I9
SI7, SI8	**S13**	**S14**	**S15**	**S16**
float. cont.	NC (T1)	NC (T2)	NC (T1)	NC (T2)
antiv.sw.	NO (T1)	NC (T2)	NO (T1)	NC (T2)
OSSD	NC (OSSD13)	NC (OSSD14)	NC (OSSD15)	NC (OSSD16)
antiv.OSSD [1]	NC (OSSD13)	NO (OSSD14)	NC (OSSD15)	NO (OSSD16)
standard.in [2]	I13	I14	I15	I16
SO1, clock output	**$1.14_{ext.out}$**	**$0\,V\,1_{ext.out}$**	**T1**	**T2**
safe output	SO1	$0\,V_{ext.out}$	T1	T2
ASi, AUX	**ASi +**	**ASi -**	**AUX $+_{ext.in}$**	**AUX $-_{ext.in}$**

[1] BWU3428: complementary OSSDs from Ident. ≥ID20940.

[2] BWU3428: emulated standard address from Ident. ≥ID20940.

Programming instructions (bit assignment of standard I/O node)

Article no.	ASi bit assignment			
BWU3428	**D3**	**D2**	**D1**	**D0**
	Eingang			
node 1	I4	I3	I2	I1
node 2	I8	I7	I6	I5
node 3	I12	I11	I10	I9
node 4	I16	I15	I14	I13

Diagnostics (device colors)

Value	Color	Description	State change	LED SO1
0	green	output on		on
1	green flashing	–		–
2	yellow	restart inhibit	auxiliary signal 2	1 Hz
3	yellow flashing	–		–
4	red	output off		off
5	red flashing	waiting for "reset of error condition" or AUX missing	auxiliary signal 1 or connect AUX	8 Hz
6	gray	internal error, such as "fatal error"	only via "Power ON" on device	all LEDs flashing
7	green/yellow	output released, but not switched on	switching-on by setting of O0	off

Assignment code half sequence - terminals

	Code half sequence	Terminals
BWU3428	**Bit0**	Input terminals: SI 2 / SI 4 / SI 6 / SI8 / SI 10 / SI 12 / SI 14 / SI 16
	Bit1	
	Bit2	Input terminals: SI 1 / SI 3 / SI 5 / SI 7 / SI9 / S11 / SI 13 / SI 15
	Bit3	

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ASi diagnostic nodes

Bit	input	output
Bit0	Diagnostic color	If P1=0 and A0=0, the output is switched off independent from release
Bit1		free
Bit2		free
Bit3	P2=1: response switch S31/S32 or S41/S42 P2=0: response of the release of the state	non existent

Accessories:

- **Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)**
- **ASi-5/ASi-3 Address Programming Device (art. no. BW4925)**

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