

ASi Safety I/O Module

ASi Safety Module with 4 x 2-channels safe inputs

- for floating contacts
- for antivalent switches ⁽¹⁾
- for OSSDs
- complementary OSSDs ⁽²⁾

resp. as standard inputs or diagnostic outputs

2 release circuits (2 x electronic safe outputs)

- augmented reliability ⁽³⁾

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



⁽¹⁾ Ident.No. ≥15197

⁽²⁾ Ident.No. ≥20343

⁽³⁾ Ident.No. ≥16797



(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	4 x 2 channels	2 release circuit; 2 x electronic safe outputs augmented reliability	floating contacts, complementary switches, OSSDs, complementary OSSDs	out of AUX	out of AUX	depending on configuration	BWU2314

⁽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.

Article no.	BWU2314
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	4 A
Input	
Number	up to 4 x 2 channels safe inputs ⁽³⁾
	up to 8 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	1,4 A
Safety Signal	floating contacts or complementary switches, SI3 + SI4 optional for 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
Input level	10 mA, R < 150 Ω
Clock outputs for floating contacts / antivalent switches	1 test pulse per clock output per second, pulse duration approx. 1 ms
Output	
Number	2 release circuits (2 x fast electronic safe outputs) ⁽³⁾
	up to 8 standard outputs (diagnostic outputs) ⁽²⁾ ⁽³⁾
Max. contact load:	0,7 A DC-13 at 24 V
Supply voltage outputs	out of AUX
Actuator supply	short-circuit and overload protected per EN 61131
Max. output current for OSSD supply	1,4 A
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)	–
LEDs S1 ... Sn (yellow)	state of input S1 ... S8
LED SO1 (yellow)	output 1 has switched
LED SO2 (yellow)	output 2 has switched

Article no.	BWU2314
Environment	
Applied standards	EN 60529 EN 61131 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	no ⁽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) emulated standard address from Ident. ≥ ID20343.

(3) see "Configuration options of connections"

(4) complementary OSSDs from Ident. ≥ ID20343.

(5) 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.

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)	
BWU2314	
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.

Terminal assignment BWU2314

BWU2314	Signal name	Description
	S22, S21, S12, S11	connection 2 channel safe input 1 (SI1) configurable for floating contacts (float.cont.), antivalent switches (antiv.sw.) or as a standard input (standard.in)/diagnostic output (diag.out)
	S42, S41, S32, S31	connection 2 channel safe input 2 (SI2)
	S62, S61, S52, S51	connection 2 channel safe input 3 (SI3) configurable for floating contacts (float.cont.), antivalent switches (antiv.sw.), OSSDs, antivalent OSSDs or as standard input (standard.in)/diagnostic output (diag.out)
	S71, S72, S81, S82	connection 2 channel safe input 4 (SI4)
	Ix	standard input x
	Ox	standard output x
	SOx	safe electronic output x
	Tx	clock output x
	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
	x.14 _{ext.out}	semiconductor output x
	0 V _{x.ext.out}	mass connection for semiconductor output x
	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

BWU2314				
Function/ configuration	terminal assignment			
SI1	S22	S21	S12	S11
float. cont.	T2	NC (T2)	NC (T1)	T1
antiv.sw.	T2	NO (T2)	NC (T1)	T1
standard.in/ diag.out ⁽¹⁾	O2	I2	I1	O1
SI2	S42	S41	S32	S31
float. cont.	T4	NC (T4)	NC (T3)	T3
antiv.sw.	T4	NO (T4)	NC (T3)	T3
standard.in/ diag.out ⁽¹⁾	O4	I4	I3	O3
SI3	S62	S61	S52	S51
float. cont.	T6	NC (T6)	NC (T5)	T5
antiv.sw.	T6	NO (T6)	NC (T5)	T5
OSSD	d.n.c.	NC (OSSD2)	NC (OSSD1)	d.n.c.
antiv.OSSD ⁽²⁾	d.n.c.	NO (OSSD2)	NC (OSSD1)	d.n.c.
standard.in/ diag.out ⁽¹⁾	O6	I6	I5	O5

BWU2314				
Function/ configuration	terminal assignment			
SI4	S71	S72	S81	S82
float. cont.	T7	NC (T7)	NC (T8)	T8
antiv.sw.	T7	NC (T7)	NO (T8)	T8
OSSD	24 V _{ext.out} ⁽³⁾	NC (OSSD3)	NC (OSSD4)	d.n.c.
antiv.OSSD ⁽²⁾	24 V _{ext.out} ⁽³⁾	NC (OSSD3)	NO (OSSD4)	d.n.c.
standard.in/ diag.out ⁽¹⁾	O7	I7	I8	O8
SO1, SO2	1.14_{ext.out}	0 V_{1ext.out}	2.14_{ext.out}	0 V_{2ext.out}
safe output	SO1	0 V _{ext.out}	SO2	0 V _{ext.out}
ASi, AUX	ASi +	ASi -	AUX +_{ext.in}	AUX -_{ext.in}

(1) emulated standard address from Ident. ≥ID20343.

(2) complementary OSSDs from Ident. ≥ID20343.

(3) OSSD supply for SI3 and SI4.

Addressing		
SEL1	SEL2	Description
0	0	RUN
E	E	RUN with ASi configuration node ⁽¹⁾
1	1	addressing Safety Input 1
2	2	addressing Safety Input 2
3	3	addressing Safety Input 3, contacts
4	4	addressing Safety Input 4, contacts
5	5	addressing Safety Input 3, OSSD (see manual for details)
6	6	addressing Safety Input 4, OSSD (see manual for details)
7	7	addressing Safety Output 1
8	8	addressing Safety Output 1, diagnostic
9	9	addressing Safety Output 2
A	A	addressing Safety Output 2, diagnostic
D	D	reset to factory defaults

(1) Ident.No. ≥15197

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

Article no.	ASi bit assignment			
BWU2314	D3	D2	D1	D0
	input			
node 1	I4	I3	I2	I1
node 2	I8	I7	I6	I5
	output			
node 1	O4	O3	O2	O1
node 2	O8	O7	O6	O5

Diagnostics (device colors)

Value	Color	Description	State change	LED SO1/SO2
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

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

Assignment code half sequence - terminals

Code half sequence	Terminals
Bit0	Input terminals: SI 21 / SI 41 / SI 61 / SI 72
Bit1	
Bit2	Input terminals: SI 12 / SI 32 / SI 52 / SI 81
Bit3	

Bit	ASi Parameter
Bit P1	
P1=0	Safety output 1.14 or 2.14 controlled by safety release and O0=1
P1=1	Safety output 1.14 or 2.14 controlled by safety release only
P2=1	Response of the release of the state to SI3
P2=0	Response switch S31 / S32 or S41 / S42 to SI3

Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- Chip card, memory capacity 32 KB (art. no. BW2079)
- ASi-5/ASi-3 Address Programming Device (art. no. BW4925)