

ASi Safety I/O Module, IP67, M12, 1SI/1SRO/1I

Safety + standard I/O in one module

Safety relay output with galvanically isolated contact sets

Additionally 1 standard input, 1 x 2 channel safe input

Applications up to category 4/PLe/SIL 3

Protection category IP67



(Figure similar)



Figure	Type	Inputs Safety, SIL 3, cat. 4	Inputs digital	Outputs Safety, SIL 3, cat. 4	Safety signal inputs	Input voltage (sensor supply) ⁽¹⁾	ASi connection ⁽²⁾	ASi address ⁽³⁾	Artikel Nr.
	IP67, 3 x M12 (51 mm x 60 mm), Safety	1 x 2 channels	1	1 release circuit, 2 x relays	floating contacts	out of AUX	ASi profile cable	2 single addresses + 1 AB address	BWU4381

- (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) **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).
- (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 nodes the second node is turned off as long as the first node is addressed to address "0".
Upon request, addresses are available with specific ASi node profiles.

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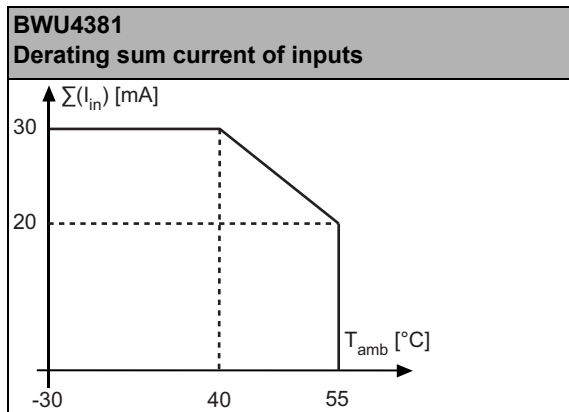
Article no.		BWU4381
Connection		
ASi/AUX connection		profile cable and piercing technology
Periphery connection		M12
Length of connector cable		unlimited ⁽¹⁾
ASi		
Profile	diagnostic AB address: S-7.A.E (ID1=5 default), value adjustable	
	safety input S-7.B.0 (ID1=F default)	
Address		2 single addresses + 1 AB address
Required master profile		≥ M3
As of ASi specification		2.1
Operating voltage		30 V _{DC} (18 ... 31,6 V)
Max. current consumption		200 mA
AUX		
Voltage		24 V (19 ... 30 V)
Current out of AUX		< 6,03 A
Input		
Number		1 standard input diagnostic, 1 x 2 channel safe input (cat. 4 / SIL 3)
Switching current		15 mA (T = 100 µs), continuously 4 mA at 24 V
Clock outputs for floating contacts		1 test pulse per clock output per second, pulse duration approx. 1 ms
Power supply		out of AUX
Power supply of attached sensors	up to +40 °C	30 mA ⁽²⁾
	at +55 °C	20 mA ⁽²⁾
Max. resistance between S 11/S12; S 21/S 22		150 Ω
Output		
Number		2 relay outputs (X3 + AUX profile cable to safely switched AUX profile cable) max. contact load: 5 A DC-13 at 24 V
Relay control		out of ASi
Max. output current	up to +40 °C	max. 6 A out of AUX at safely switched profile cable ⁽³⁾ max. 3 A per contact to X3 (max. 3 A at contact pins 1+2 and max. 3 A at contact pins 3+4) ⁽⁴⁾
	at +55 °C	max. 5 A out of AUX at safely switched profile cable ⁽³⁾ max. 2,5 A per contact to X3 (max. 2,5 A at contact pins 1+2 and max. 2,5 A at contact pins 3+4) ⁽⁴⁾
Max. inrush current		20 A for 20 ms
Number of switching operations		
Usage category (EN 60347-4-1 / EN 60947-5-1)		DC 1: 24V/6A (ca. 300 x 10 ³ cycles) DC 13: 24V/5A/0,1 Hz (ca. 40 x 10 ³ cycles)
Display		
LED S1, S2 (yellow)		state of safe input channels S1, S2
LED I1 (yellow)		state of input I1
LED ASi (green)		on: ASi voltage on flashing: ASi voltage on, but peripheral fault ⁽⁵⁾ or address 0 off: no ASi voltage
LED FAULT (red)		on: ASi node address 0 or ASi node off line flashing: peripheral fault ⁽⁵⁾ off: ASi node on line
LED AUX (green)		on: 24 V _{DC} AUX (unswitched) off: no 24 V _{DC} AUX (unswitched)
LED SO1.1 (yellow)		for definition see table "device colors"
LED SO1.2 (yellow)		for definition see table "device colors"

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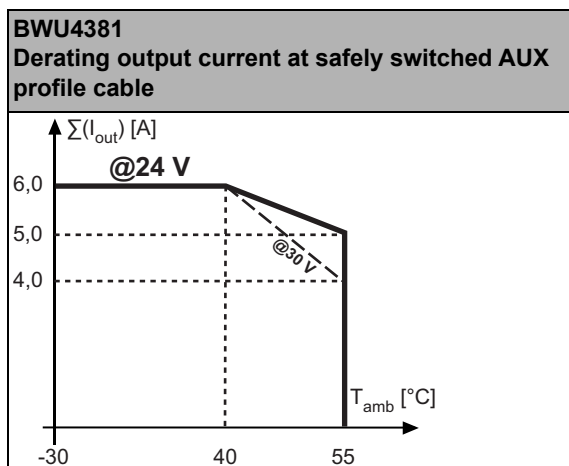
Article no.	BWU4381
Environment	
Applied standards	EN 61508 EN ISO 13849-1 EN 62061 EN 60947-5-1 EN 60529
Passive safety (up to PLe/SIL 3)	yes ⁽⁶⁾
Operating height max.	max. 2000 m
Ambient temperature	-30 °C ... +55 °C ^{(2) (3) (4) (7)}
Storage temperature	-25 °C ... +85 °C
Housing	plastic, for DIN rail mounting or for screw mounting ⁽⁸⁾
Pollution degree	2
Protection category	IP67
Tolerable loading referring to humidity	acc. EN61131-2
Voltage of insulation ASi to AUX _{ext. in}	≥500 V
Weight	265 g
Dimensions (L / W / H in mm)	152 / 60 / 60

(1) loop resistance ≤150 Ω

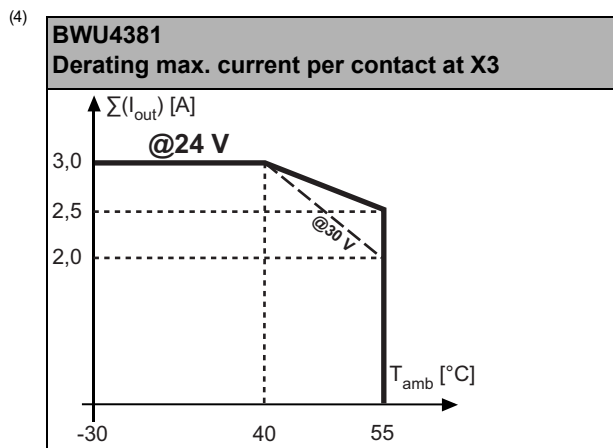
(2)



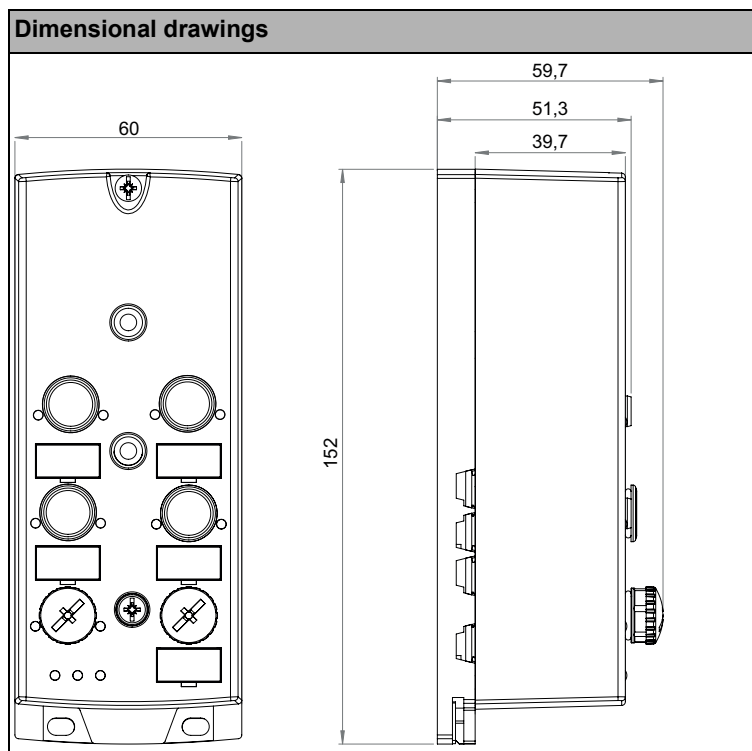
(3)



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- (5) See table "Peripheral fault indication"
- (6) Exclusion of errors for the connection of the two ASi and AUX potentials can be assumed in the module, or the module has no AUX connection. Passive safety for the application can only be achieved if this is ensured for all components used.
- (7) Maximum ambient operating temperature +55 °C according UL certificate for the use in the USA and Canada
- (8) Depending on substructure module (see accessories). The substructure module is not included in the scope of delivery.



Article no.	Peripheral fault indication		
	Overload sensor supply	Output short circuited	AUX voltage missing
BWU4381	-	-	•

UL-specifications (UL508)	
BWU4381	
External protection	An isolated source with a secondary open circuit voltage of $\leq 30 V_{DC}$ 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.

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Diagnostic address

Programming instructions (Bit values of inputs/outputs, diagnostic address)					
Bit	ASi output		Bit	ASi input	
O0	not used		I0	Diagnostic (for definition see table "device colors")	
O1	Parameter P1=1	Parameter P1=0	I1		
	not used	1: output controlled by safety release 0: inhibits output on irrespective of safety release	I2		
O2	not used		I3		
O3	inexistent		I3	Parameter P2=0	Parameter P2=1
				1: feedback for user: <i>safety release on</i> 0: feedback for user: <i>safety release off</i>	I1

Peripheral fault indicates unavailable 24 V ext.

Diagnostic (device colors)				
Value	Color	Description	State change	LED "Out"
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"	auxiliary signal 1	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 O1	off

Programming instructions Diagnostic Address (bit values of the ASi parameter)	
Bit P1	
P1=1	safety output controlled by safety release only
P1=0	safety output controlled by output O1 in addition to safety release
Bit P2	
P2=1	input I1 at ASi bit I3
P2=0	feedback for user: release on
Bits P0, P3:	
not used	

Release		ASi Safety Relay Output Module, safety release from the ASi safety monitor...	
		... not received	... received
ASi parameter (AB address) changes the function of output bit O1	ASi parameter P1=1 (default) O1=0	safety output contact set open	safety output contact set closed
	ASi parameter P1=1 O1=1	safety output contact set open	safety output contact set closed
	ASi parameter P1=0 O1=0	safety output contact set open	safety output contact set open
	ASi parameter P1=0 O1=1	safety output contact set open	safety output contact set closed

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2 channel safe input

Programming instructions (bit values of the safety input address)			
Bit	ASi output	Bit	ASi input
	outputs not used	I0, I1	safety input S 1
		I2, I3	safety input S 2

Peripheral fault indicates cross-connection between the safety inputs.

Connections								
Article no.	M12 connection	Marking	Function	Pin1	Pin2	Pin3	Pin4	Pin5
BWU4381	X1	S1/S2	safe input (float. contacts)	S11	S12	S21	S22	n.c.
	X2	I1	standard input	24 V _{ext out}	n.c.	0 V _{ext out}	I1	n.c.
	X3	SO1.1	safe coupling	1.13	1.14	1.23	1.24	n.c.
	X4	n.c. (dummy plug)						
	SEL	SEL	rotary switch (protection cap)					
	ADDR	ADDR	connection for ASi-3 addressing plug (protection cap)					

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Keying of the profile cable	
Article no.	
BWU4381	

Rotary Switch Positions (addressing)	
SEL1	Description
0	reserved
1	addressing standard input /safe output diagnosis
2	addressing safety output
3	addressing safety input
4	RUN
5	RUN without safety input
6-F	reserved

Accessories:

- ASi substructure module (CNOMO) for 8 channel module in 60 mm housing, screw mounting (art. no. BW2351)
- ASi substructure module (CNOMO) for 8 channel module in 60 mm housing, DIN rail mounting (art. no. BW3516)
- Universal protection cap ASi-5/ASi-3 for M12 sockets, IP67 (art. no. BW4056)
- Sealing profile IP67 (IDC plug), 60 mm (art. no. BW3282)
- ASi-5/ASi-3 Address Programming Device (art. no. BW4925)