

Safety + standard I/O in one module

ASi Safety relay output with galvanically isolated contact sets, approved up to 230 V

Applications up to category 4/PLe/SIL 3

Protection category IP20











Figure	Inputs digital, EDM ⁽¹⁾	• • •	(sensor	Output voltage (actuator supply.) ⁽³⁾	ASi address ⁽⁴⁾	Article no.
	1 EDM	1 release circuit; 2 x relay	out of ASi	-	1 single address + 1 AB address	BWU2045

(1) Inputs digital, EDM

An externally connected relay (contactor) can be monitored by connecting the feedback loop to the EDM input.

- (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 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.	BWU2045
Connection	
ASi connection	push-in terminals ⁽¹⁾
Periphery connection push-in terminals (1)	
Length of connecting cable	I: max. 15 m ⁽²⁾
	O: unlimited
ASi	
Profile	S-7.A.E (ID1=5 default), value adjustable
Address	1 Single address + 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
Max. current consumption without sensor/ actuator supply	100 mA
Inputs	
Number	1 diagnostic + 1 EDM
Switching current	15 mA (T = 100 μs), continuously 4 mA at 24 V
Power supply	out of ASi
Power supply of attached sensors	90 mA
External device monitoring supplied out of ASi, (EDM) supplied out of ASi, approx. 24 V, approx. 10 mA	
Output	
Number	1 relay output max. contact load: 3 A DC-13 at 24 V or 3 A AC-15 at 230 V protection via external fuse, max. 4 A semi time-lag type E
Max. output current	max. 3 A
Max. inrush current	20 A for 20 ms
Number of switching operation	ons
Usage category	AC1: 230 V/3 A (ca. 150 x 10 ³ cycles)
(EN 60347-4-1 /	AC 15: 230 V/3 A (ca. 80 x 10 ³ cycles)
EN 60947-5-1)	DC 1: 24 V/3 A (ca. 500 x 10 ³ cycles)
	DC 13: 24 V/3 A/0,1 Hz (ca. 50 x 10 ³ cycles)
Display	
LED I1 In (yellow)	state of inputs I1 I3
LED 1.Y1 (yellow)	state of EDM input 1.Y1
LED ASI (green)	ASi voltage ON
LED FAULT (red)	ASi fault
LED OUT (yellow)	for definition see table "Diagnostic (device color)"
LED ALARM (red)	PLC indicates alarm



Article no.	BWU2045
Environment	
Applied standards	EN 61508:2010 EN ISO 13849-1:2015 EN 62061:2005+Cor.:2010+A1:2013+A2:2015 EN 60947-5-1:2004+ Cor.:2005+A1:2009 EN 60529
It can be used with a switched AUX cable, which is passively safe up to SIL3/PLe	yes ⁽³⁾
Operating height max.	5000 m
Ambient temperature	-30 °C +55 °C ⁽⁴⁾ , no condensation permitted
Storage temperature	-25 °C +85 °C
Relative humidity max.	90% (40 °C), no condensation permitted
Pollution degree	2
Protection category	IP20
Housing	plastic, Din-rail mounting
Voltage of insulation relay contact to ASi resp.AUX _{ext.in}	2,3 kV
Voltage of insulation ASi to AUX _{ext.in}	500 V
Rated impulse withstand voltage	1500 V
Weight	149 g
Dimensions (L / W / H in mm)	22,5 / 99 / 114

⁽¹⁾ see table "wiring instructions"

Wiring instructions

	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	without plastic sleeve: 0.25 2.5 mm ²
flexible, with ferrule	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

⁽²⁾ Loop resistance ≤150 Ω

 $^{^{(3)}}$ The module is suitable for use in passively safe paths as it has no connection to an AUX potential.

⁽⁴⁾ temperature range up to -30°C from Ident.No. ≥16366



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UL-specifications (UL508) BWU2045	
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.

Diagnostic operation ID1 = 5_{hex} (default)

Pro	Programming instructions (Bit values of inputs/outputs, Diagnostic node)					
Bit	ASi output		Bit	ASi input		
	1: Alarm LED on 0: Alarm LED off		10	Diamontis		
01	Parameter P1=1	Parameter P1=0	l1	Diagnostic (for definition see table "Diagnostics (device		
	not used	output controlled by safety release inhibits output on irrespective of safety release		colors)")		
02	not used		12			
О3	inexistent		13	1.Y1		

Diagno	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		

Progra	Programming instructions Diagnostic node (bit values of the ASi parameter)			
Bit P1	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	Bit P2			
P2=1	LED I3: safety release			
P2=0	0 LED I3: state of I3			
Bits P	Bits P0, P3:			
not use	not used			



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

3 standard inputs instead of diagnostic ID1=7_{hex}, connection of sensors



The configuration using 3 standard inputs is not advisable, as there is no diagnostic information available in this mode of operation!

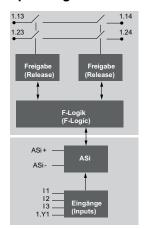
Pro	Programming instructions (Bit values of inputs/outputs AB-node)					
Bit	Bit ASi output			ASi input		
	1: Alarm LED <i>on</i> 0: Alarm LED <i>off</i>		10	11		
01	Parameter P1=1 Parameter P1=0		11	12		
	not used	output controls by safety release inhabits output on irrespective of safety release				
02	not used		12	Parameter P2=0	Parameter P2=1	
				13	1: feedback for user: safety release on 0: feedback for user: safety release off	
О3	3 inexistent			1.Y1		

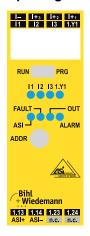
Progra	Programming instructions AB node (bit values of the ASi parameter)			
Bit P1	Bit P1			
P1=1	safety output controlled by safety release only			
P1=0	safety output controlled by output O1 in addition to safety release			
Bit P2				
P2=1	feedback: safety release at ASi bit I2 / LED I3			
P2=0	input I3 at ASi bit I2			
Bits PO	Bits P0, P3			
not use	not used			

Release		ASi Safety Relay Output Module, safety release from the ASi safety monitor		
		not received	received	
ASi parameter (AB node) 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	



Operating elements and clamp assignment





Clamps/Switch	Description	
I1, I2, I3	standard inputs I1, I2 and I3	
1.13, 1.14	safety output contact set 1	
1.23, 1.24	safety output contact set 2	
I -, I +	supply voltage for inputs (out of ASi)	
1.Y1	EDM / input for electronic device monitoring	
ASi +, ASi –	ASi network connection	
ADDR	connection for ASi-3 addressing plug	
PRG	Programming of safety-related ASi address enabled.	
RUN	Programming of non safety-related ASi address enabled	

LEDs	State	Signal / Description		
ASI (green)	Ф	no operating voltage		
	1 Hz	operating voltage present, safety-related ASi address and/or ASi AB address is "0"		
	*	operating voltage present		
FAULT (red)	Ф	ASi communication OK		
	*	no data exchange with AB node and/or safety-related ASi address is "0"		
OUT (yellow)	Ф	output relays contacts open		
	1 Hz	restart inhibit, waiting for the start signal, the output relays switch-on after the start signal		
	**\(\frac{1}{8}\) Hz	device is in unlockable error state. Waiting for "reset of error condition signal". After receiving this signal the device follows up with normal operation.		
	*	output relays contacts closed		
ALARM (red)	Ф	ASi output bit "O0" is <i>not</i> set		
	*	ASi output bit "O0" is set		
I1, I2, I3, 1.Y1 (yellow)	Ф	the corresponding input is <i>not</i> connected (mode standard inputs) or release has not been issued (I3, diagnostic mode)		
	*	the corresponding input is connected (mode standard inputs) or release has not been issued (I3, diagnostic mode)		
	→ o (running light) switch is adjust to PRG position			
LED ON LED flashing LED OFF				



In case all LEDs are blinking simultaneously in fast rhythm a fatal error has been detected. This message is reset by a short-run disconnection of the power supply (Power On Reset).



Note

To achieve passive safety, the device must be installed in a switching cabinet with protection class IP54.



Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)
- Double level push-In terminals kit for ASi and AUX (art. no. BW3420)
- ASi-5/ASi-3 Address Programming Device (art. no. BW4925)
- Bihl+Wiedemann Safety Suite License Safety Software for Configuration, Diagnostics and Commissioning (art. no. BW2916)