

ASi Safety Relay Output Module with Diagnostic Slave and 1 EDM Input

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 similar)



Figure	Type	Housing	Inputs digital, EDM ⁽¹⁾	Outputs Safety, SIL 3, cat 4	Input voltage (sensor supply) ⁽²⁾	Output voltage (actuator supply) ⁽³⁾	ASi address ⁽⁴⁾	Article no.
	IP20, 22,5 mm x 114 mm, 4 x COMBICON, Safety	4 x COMBICON	1 EDM	1 release circuit; 2 x relay	out of ASi	–	1 single slave + 1 AB slave	BWU2045

(1) **Inputs digital, EDM**

An externally connected relay (contactor) can be connected via a feedback loop to the Safety Monitor for monitoring purposes.

(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 Slave (max. 62 AB Slaves/ASi network), 2 AB Slaves (max. 31 modules with 2 AB Slaves), Single Slaves (max. 31 Single Slaves/ASi network), mixed use allowed.

For modules with two slaves the second slave is turned off as long as the first slave is addressed to address "0".
Upon request, slaves are available with specific ASi Slave profiles.

ASi Safety Relay Output Module with Diagnostic Slave and 1 EDM Input

Article no.	BWU2045
Connection	
ASi connection	COMBICON plugs, push-in terminals ⁽¹⁾
Periphery connection	COMBICON plugs, push-in terminals ⁽¹⁾
Length of connecting cable	I/O: max. 15 m ⁽²⁾
ASi	
Profile	S-7.A.E (ID1=5 default), value adjustable
Address	1 Single Slave + 1 AB Slave
Required master profile	≥ M3
As of ASi specification	2.1
Operating voltage	30 V _{DC} (18 ... 31,6 V)
Max. current consumption	< 200 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 (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 operations	
Usage category (EN 60347-4-1 / EN 60947-5-1)	AC1: 230 V/3 A (ca. 150 x 10 ³ cycles) AC 15: 230 V/3 A (ca. 80 x 10 ³ cycles) 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
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
Operating height max.	5000 m
Ambient temperature	-30 °C ... +55 °C ⁽³⁾ , 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	≥6 kV
Weight	149 g
Dimensions (L / W / H in mm)	22,5 / 99 / 114

⁽¹⁾ see table „wiring instructions“

⁽²⁾ Loop resistance ≤150 Ω

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⁽³⁾ temperature range up to -30°C from Ident.No. ≥16366

Wiring instructions

Push-in terminals	
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: 0,2 ... 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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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)

Programming instructions (Bit values of inputs/outputs, Diagnostic Slave)				
Bit	ASi output		Bit	ASi input
00	1: Alarm LED <i>on</i> 0: Alarm LED <i>off</i>		10	Diagnostic (for definition see table „Diagnostics (device colors)“)
01	Parameter P1=1	Parameter P1=0	11	
	not used	1: output controlled by safety release 0: inhibits output on irrespective of safety release		
02	not used		13	
03	inexistent			


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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 Slave (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	LED I3: safety release
P2=0	LED I3: state of I3
Bits P0, P3:	
not used	

Release		ASi Safety Relay Output Module, safety release from the ASi safety monitor	
		not received	received
ASi Parameter (Diagnostic Slave) 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

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!

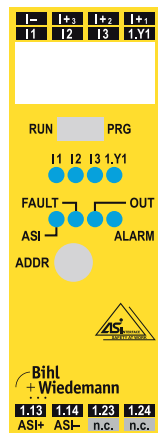
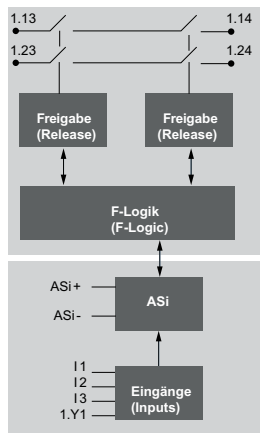
Programming instructions (Bit values of inputs/outputs AB-Slave)				
Bit	ASi output		Bit	ASi input
O0	1: Alarm LED on 0: Alarm LED off		I0	I1
O1	Parameter P1=1	Parameter P1=0 1: output controls by safety release 0: inhabits output on irrespective of safety release	I1	I2
	not used			
O2	not used		I2	Parameter P2=0
			I3	Parameter P2=1 1: feedback for user: safety release on 0: feedback for user: safety release off
O3	inexistent		I3	1.Y1

ASi Safety Relay Output Module with Diagnostic Slave and 1 EDM Input

Programming instructions AB slave (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	feedback: safety release at ASi bit I2 / LED I3
P2=0	input I3 at ASi bit I2
Bits P0, P3	
not used	

Release		ASi Safety Relay Output Module, safety release from the ASi safety monitor	
		not received	received
ASi parameter (AB slave) 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	addressing socket
PRG	Programming of safety-related ASi address enabled.
RUN	Programming of non safety-related ASi address enabled

LEDs	State	Signal / Description
ASi (green)	⊖	no operating voltage
	⊕ 1 Hz	operating voltage present, safety-related ASi address and/or ASi AB address is „0“
	⊕	operating voltage present
FAULT (red)	⊖	ASi communication OK
	⊕	no data exchange with AB slave and/or safety-related ASi address is „0“

ASi Safety Relay Output Module with Diagnostic Slave and 1 EDM Input

LEDs	State	Signal / Description
OUT (yellow)		output relays contacts open
	 1 Hz	restart inhibit, waiting for the start signal, the output relays switch-on after the start signal
	 8 Hz	device is in unblockable 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)		ASi output bit A0 is <i>not</i> set
		ASi output bit A0 is set
I1, I2, I3, 1.Y1 (yellow)		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)
	 (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).

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)