

AS-i Safety Relay Output Module with Diagnostic Slave and 1 EDM input

Safety + standard I/O in one module

AS-i Safety relay output with galvanically isolated contact sets,
approved up to 230V

IEC 61 508 SIL 3, EN 13 849-1/PLe Kat 4, EN IEC 62 061 SIL 3

Protection category IP20



Article no. BWU2045

The stainless steel AS-i Safety Monitor controls the safety relays of the AS-i Safety Relay Output Module by using a safety AS-i single address. To set the safety AS-i address, the dip-switch has to be in the PRG position. Addressing can then be accomplished by using an AS-i addressing device, for example.

Several AS-i Safety Relay Output modules can have the same safety address and can be controlled via this same safety address on a AS-i circuit. All AS-i Safety Relay Output Modules with the same safety address are controlled simultaneously.

In addition to the safety single address the module also supports an AB-address e.g. used to transmit the states of the standard inputs.

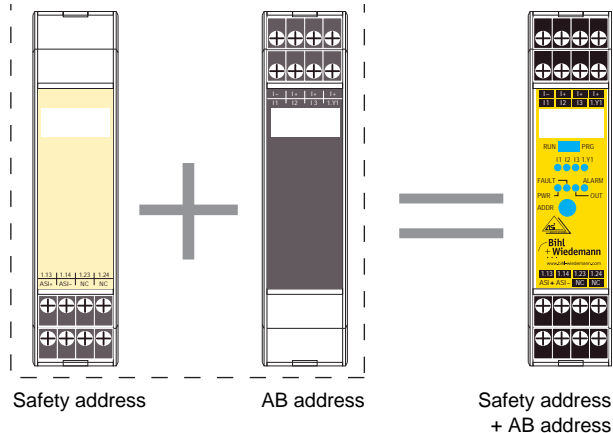
To set the AB address of the inputs, e.g. with an AS-i addressing device, the dip-switch has to be in the RUN position.

BWU2045: 2 AS-i modules in one housing!

1 safety relay output

1 diagnostic- and 1 EDM input

BWU2045



Article no.	BWU2045
Connection	
Connection	4 x COMBICON
Length of connecting cable	inputs max. 15m
AS-i	
Profile	S.7.A.E ID1 = 5 _{hex} (default), value adjustable
Address	1 Single Slave + 1 AB Slave
Operating voltage	30V _{DC}
Required master profile	≥ M3
As of AS-i specification	2.1
Max. current consumption	< 200 mA
Inputs	
Number	1 Diagnose + 1 EDM
Switching current	static 4mA at 24V, dynamic 15mA at 24V (T = 100µs)
Power supply	out of AS-i
Power supply of attached sensors	90mA

AS-i Safety Relay Output Module with Diagnostic Slave and 1 EDM input

Output	
Number	1 relay output max. contact load: 3A DC-13 at 24V or 3A AC-15 at 230V
Max. output current	max. 3A
External device monitoring (EDM)	supplied out of AS-i, approx. 24V, approx. 10mA
Number of switching operations	
Usage category (DIN EN60 347-4-1 / EN 60 947-5-1)	AC1: 230V/3A (ca. 150 x 10 ³ cycles) AC 15: 230V/3A (ca. 80 x 10 ³ cycles) DC 1: 24V/3A (ca. 500 x 10 ³ cycles) DC 13: 24V/3A/0,1 Hz (ca. 50 x 10 ³ cycles)
Display	
LED I1 ... I3 (yellow)	state of inputs I1 ... I3
LED 1.Y1 (yellow)	state of EDM input 1.Y1
LED PWR (green)	AS-i voltage ON
LED FAULT (red)	AS-i fault
LED OUT (yellow)	for definition see table "device color"
LED ALARM (red)	PLC indicates alarm
Environment	
Applied standards	IEC 61508 SIL 3 EN ISO 13849-1:2008/AC:2009/PLe cat 4 EN IEC 62061 SIL 3
Voltage of insulation	≥ 6 kV
Operating temperature	0°C ... +55 °C
Storage temperature	-25°C ... +85 °C
Protection category DIN EN 60529	IP20
Housing	Din-rail mounting
Dimensions (L / W / H in mm)	22,5 / 99 / 114

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

Programming instructions (Bit values of inputs/outputs, Diagnostic Slave)				
Bit	AS-i output		Bit	AS-i input
O0	1: Alarm LED on 0: Alarm LED off		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		
O2	not used		I2	
O3	inexistent		I3	1.Y1

Diagnostic (device colors)				
Value	Color	Description	State change	LED "Out"
0	green	output on		on
1	green flash- ing	–		–
2	yellow	restart inhibit	auxiliary signal 2	1 Hz
3	yellow flash- ing	–		–
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 AS-i parameter)	
Bit P1	
P1=1	safety output controlled by safety release only

AS-i Safety Relay Output Module with Diagnostic Slave and 1 EDM input

Programming instructions Diagnostic Slave (bit values of the AS-i parameter)	
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		AS-i Safety Relay Output Module, safety release from the AS-i safety monitor	
		not received	received
AS-i Parameter (Diagnostic Slave) changes the function of output bit O1	AS-i Parameter P1=1 (default) O1=0	safety output contact set open	safety output contact set closed
	AS-i Parameter P1=1 O1=1	safety output contact set open	safety output contact set closed
	AS-i Parameter P1=0 O1=0	safety output contact set open	safety output contact set open
	AS-i Parameter P1=0 O1=1	safety output contact set open	safety output contact set closed

3I standard inputs (instead of diagnostic) ID1=7_{hex}

Connection of sensors

Programming instructions (Bit values of inputs/outputs AB-Slave)			
Bit	AS-i output		Bit AS-i input
00	1: Alarm LED <i>on</i> 0: Alarm LED <i>off</i>		I0 I1
01	Parameter P1=1	Parameter P1=0	I1 I2
	not used	1: output controlled by safety release 0: inhibits output on irrespective of safety release	
02	not used		I2 Parameter P2=0 Parameter P2=1
			I3 1: feedback for user: <i>safety release on</i> 0: feedback for user: <i>safety release off</i>
03	inexistent		I3 1.Y1

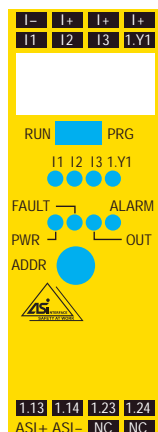
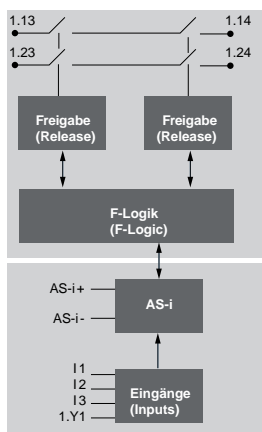
Programming instructions AB slave (bit values of the AS-i parameter)	
Bit P1	
P1=1	safety output controlled by safety release only
P1=0	safety output controlled by output O1 in addition to safety release
Bit P2	
P2=1	feedback: safety release at AS-i bit I2 / LED I3
P2=0	input I3 at AS-i bit I2
Bits P0,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

Release	AS-i Safety Relay Output Module, safety release from the AS-i safety monitor	
	not received	received

AS-i Safety Relay Output Module with Diagnostic Slave and 1 EDM input

AS-i parameter (AB slave) changes the function of output bit O1	AS-i Parameter P1=1 (default) O1=0	safety output contact set open	safety output contact set closed
	AS-i Parameter P1=1 O1=1	safety output contact set open	safety output contact set closed
	AS-i Parameter P1=0 O1=0	safety output contact set open	safety output contact set open
	AS-i 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 AS-i)
1.Y1	EDM / input for electronic device monitoring
AS-i+, AS-i-	AS-i network connection
ADDR	addressing socket
PRG	protective mode not possible. Programming of safety-related AS-i address enabled
RUN	protective mode possible. Programming of non safety-related AS-i address enabled

LEDs	State	Signal / Description
PWR (green)		no operating voltage
		operating voltage present, safety-related AS-i address and/or AS-i AB address is „0“
		operating voltage present
FAULT (red)		AS-i communication OK
		no data exchange with AB slave and/or safety-related AS-i address is „0“
OUT (yellow)		output relays contacts open
		restart inhibit, waiting for the start signal, the output relays switch-on after the start signal
		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)		AS-i output bit A0 is <i>not</i> set
		AS-i output bit A0 is set

AS-i Safety Relay Output Module with Diagnostic Slave and 1 EDM input

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).
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Accessories:

- Safe contact expander, 1 or 2 independent channels (art. no. BWU2548 / BWU2539)