AS-i Safety Output Module, IP20

AS-i Safety Output Module

Safe outputs and standard inputs in one module

Protection category IP20

Figure	Housing	Inputs digital	Outputs Safety, SIL3, cat.4	Input voltage (sensor supply)[1]	Output voltage (actuator supply)[2]	AS-i connection[3]	AS-i address[4]	Article no.
	6 x COMBICON	8	1-8 release circuits, 8 x fast electronic safe outputs	out of AUX	out of AUX	clamps	depending on number of release circuits	**BWU2836**

1 **Input voltage (sensor supply):**
inputs are supplied by AS-i or by AUX (auxiliary 24 V power). If supplied by AS-i, inputs shall not be connected to earth or to external potential.

2 **Output voltage (actuator supply):**
outputs are supplied by AS-i or by AUX (auxiliary 24 V power). If supplied by AS-i, outputs shall not be connected to earth or to external potential.

3 **AS-i connection:**
the connection to AS-i as well to AUX (auxiliary 24 V power) is made via yellow resp. black AS-i profile cable with piercing technology or via M12 socket (in IP20 via clamps).

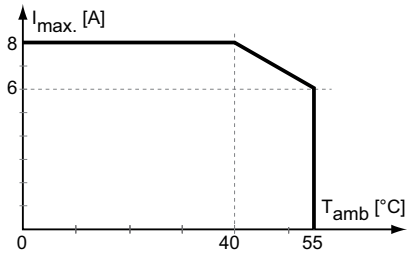
4 **AS-i Address:**
AB Slave (max. 62 AB Slaves/AS-i network), 2 AB Slaves (max. 31 modules with 2 AB Slaves), Single Slaves (max. 31 Single Slaves/AS-i network), mixed use allowed (upon request, slaves are available with specific AS- Slave profiles).

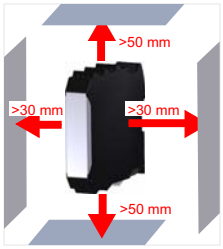
Article no.	BWU2836
Connection	
Connection	COMBICON plug
Length of connector cable	unlimited[1]
AS-i	
Profile	configuration slave: S-7.A.5 4I/4O slaves: S-7.A.7 diagnostics slaves: S-7.A.E
Addresses	depending on configuration
Required Master profile	≥M4
Since AS-i specification	3.0
Operating voltage	18 ... 31,6 V
Max. current consumption	200 mA
AUX	
Voltage	20 ... 30 V (PELV)
Max. current consumption	8 A
Inputs	
Number	8 digital inputs
Power supply	out of AUX
Input level	U<5 V (low) U>15 V (high)
Outputs	
Number release circuits	1-8 release circuits, configurable
Number	8 x fast electronic safe outputs
Power supply	out of AUX
Max. output current	2 A per output, ∑ = max. 8 A (see table „Derating for output current“)
Test pulse	if output is switched on: minimum distance between two test pulses: 250 ms, pulse length 1 ms
Display	
LED ASI (green)	AS-i power
LED FAULT/FLT (red)	AS-i error
LEDs I1 ... In (yellow)	state of inputs I1 ... I4
LEDs SO1 ... SOn (yellow)	state of safe outputs SO1 ... SO8
LED ALARM	PLC reports alarm
LED AUX (red)	on: 24 V_{DC} AUX on off: no 24 V_{DC} AUX
Environment	
Applied standards	EN 62026-2:2013 EN 61508:2010 EN 62061:2005/A1:2013 EN ISO 13 849-1:2008/AC:2009
Operating altitude	max. 2000 m
Ambient temperature	0 °C ... +55 °C
Storage temperature	-25 °C ... +85 °C
Housing	plastic, din-rail mounting
Tolerable loading referring to humidity	according to EN 61131-2
Protection category EN 60529	IP20
Voltage of insulation	≥500 V
Weight	270 g
Dimensions (W / H / D) in mm	22,5 / 99 / 114

[1] loop resistance ≤ 150 Ω

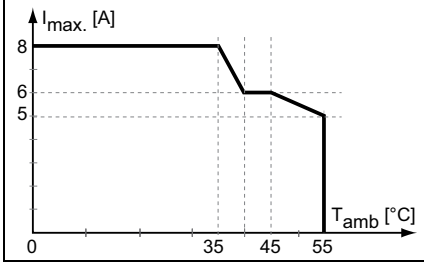
Derating for output current

Installation with mounting distance 3 cm left/right





Installation without mounting distance



Diagnostic slave 1-8 (depending on number of release circuits)

Bit setting of in- and outputs

Bit	AS-i output		Bit	AS-i input	
O0	**Parameter P1=1**	**Parameter P1=0**	I0	Diagnostic (see table („Diagnostic (device colors")“)	
	not used	1: output controlled by safety release 0: inhibits output on irrespective of safety release			
O1	not used		I1		
O2	not used		I2		
O3	inexistent		I3	**Parameter P2=0**	**Parameter P2=1**
				1: feedback for user: *safety release on* 0: feedback for user: *safety release off*	In[1]

Peripheral fault indicates unavailable AUX or overload on the outputs

[1] state of the assigned input.

Release conditions

				Standard I/O slaves		
				Slave 1		
				Parameter P0 = 0	Parameter P0 = 1	
					Bit D_{n-1} = 0	Bit D_{n-1} = 1
Diagnostic slaves	Slave 1 ... 4s	Parameter P1 = 1		SO_n = release	SO_n = off	SO_n = release
		Parameter P1 = 0	Bit O0 = 1	SO_n = release	SO_n = off	SO_n = release
			Bit O0 = 0	SO_n = off	SO_n = off	SO_n = off

				Standard I/O slaves		
				Slave 2		
				Parameter P0 = 0	Parameter P0 = 1	
					Bit D_{n-1} = 0	Bit D_{n-1} = 1
Slave 5 ... 8s	Parameter P1 = 1			SO_n = release	SO_n = off	SO_n = release
	Parameter P1 = 0	Bit O0 = 1		SO_n = release	SO_n = off	SO_n = release
		Bit O0 = 0		SO_n = off	SO_n = off	SO_n = off

Diagnostic (device colors)				
Value	**Color**	**Description**	**State change**	**LED SO1 ... SO8**
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 O0	off

Programming instructions diagnostic slave (bit setting)	
Bit P1	
P1=1	safety output controlled by safety release only
P1=0	safety output controlled by safety release and O0=1
Bit P2	
P2=1	input In[1] at AS-i bit I3
P2=0	feedback for user: release *on*
Bits P0, P3:	
not used	

[1] state of the assigned input.

4I/4O slave

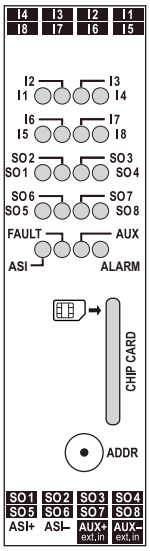
Programming 4I/4O slaves (bit setting)						
Bit	**AS-i output**		**Bit**	**AS-i output**		
	Slave 1	**Slave 2**		**Slave 1**	**Slave 2**	
O0	SO1	SO5	**I0**	I1	I5	
O1	SO2	SO6	**I1**	I2	I6	
O2	SO3	SO7	**I2**	I3	I7	
O3	SO4	SO8	**I3**	I4	I8	

Programming instructions 4I/4O slave (bit setting)	
Bit P0	
P0=1	safety output controlled by safety release and output bit = 1
P0=0	safety output controlled by safety release only
Bits P1, P2,P3:	
not used	

Configuration slave

Programming hints			
Bit	**AS-i output**	**Bit**	**AS-i input**
O0, O1	communication CTT2	**I0, I1**	not used
O2, O3	LED ALARM not used	**I2, I3**	communication CTT2

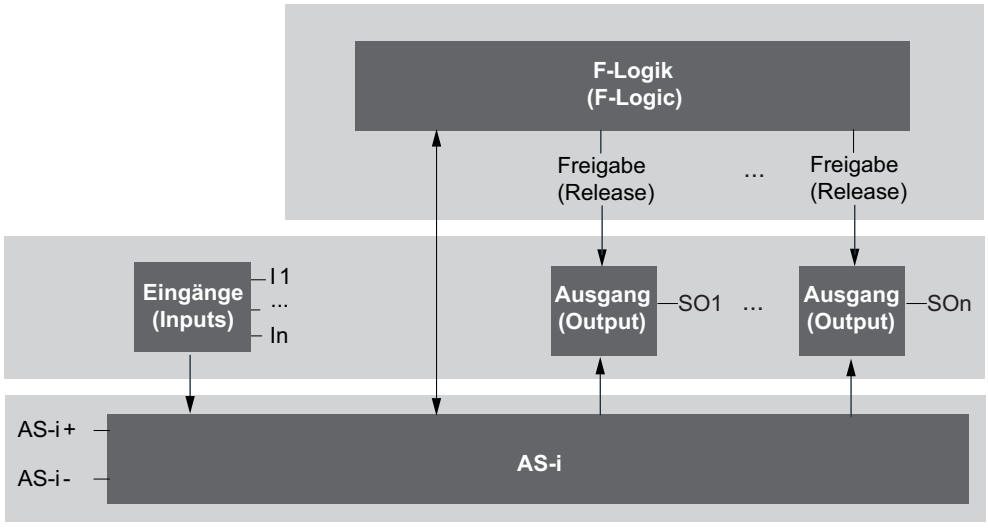
Peripheral fault indicates unavailable AUX.

BWU2836	Clamps	Description
	I1 ... In	digital inputs
	SO1 ... SOn	safe outputs
	AS-i+, AS-i-	connection to the AS-i bus
	$AUX+_{ext.in}$	supply voltage out of external 24 V, positive pole
	$AUX-_{ext.in}$	supply voltage of external 24 V, negative pole

Diagnostics (device colors)

Value	Color	Description	State change	LED SOn
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

Block diagram



As long as the F-logic has - by means of the safe AS-i output slaves- released, the physical outputs can be switched via the data bits of the 4I/4O slaves via standard control. If the release is omitted, the physical outputs will be switched off safely.

All 8 physical outputs can be released jointly by a safe AS-i output slave. However, it is also possible to install one safe AS-i output slave for each single physical output. Each intermediate setting is possible, e.g. one safe AS-i output slave for 2 physical outputs.