ASi Safety I/O Module, IP67, M12, 6-8SI/2SO/16I/16O

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ASi Safety I/O-Module

up to 8 x 2 channel safe inputs (depending on configuration),

adjustable for
floating contacts, OSSDs or complementary switches resp. as standard inputs and standard outputs

and

up to 2 release circuits (up to 2 x electronic safe outputs) (depending on configuration)

Memory Plug

protection category IP67

(Figure similar)

ASi c(UL)us LISTED E227214 CE

Figure	Type	Inputs Safety, SIL 3, cat. 4	Outputs Safety, SIL 3, cat. 4	Safety signal inputs	Input voltage (sensor supply.) [1]	Output voltage (actuator supply.) [2]	ASi connection [3]	ASi address [4]	Article no.
	IP67, 8 x M12, Safety	6-8 x 2 channels; depending on configuration	up to 2 release circuits; up to 2 x electronic safe outputs; depending on configuration	floating contacts, OSSDs, complementary switch	out of ASi	out of ASi	ASi profile cable	depending on configuration	**BWU3489**
	IP67, 8 x M12, Safety	6-8 x 2 channels; depending on configuration	up to 2 release circuits; up to 2 x electronic safe outputs; depending on configuration	floating contacts, OSSDs, complementary switch	out of ASi	out of ASi	ASi using M12	depending on configuration	**BWU3499**
	IP67, 8 x M12, Safety	6-8 x 2 channels; depending on configuration	up to 2 release circuits; up to 2 x electronic safe outputs; depending on configuration	floating contacts, OSSDs, complementary switch	out of AUX	out of AUX	ASi profile cable	depending on configuration	**BWU3490**

[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] **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

[3] **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).

[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 I/O Module, IP67, M12, 6-8SI/2SO/16I/16O

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Article no.	BWU3499	BWU3489	BWU3490
Connection			
ASi/AUX connection	M12	profile cable and piercing	
Periphery connection	M12		
Length of connector cable	unlimited [1]		
ASi			
Profile	safe input slaves: S-7.B.0 (ID1=F) and S-7.B.1 (ID1=F) diagnostic slaves: S-7.A.E (ID1=5) 4I/4O slaves: S-7.E (ID1=F) configuration slave: S-7.A.5 (ID1=7)		
Addresses	depending on configuration		
Required Master profile	≥M4		
Since ASi specification	3.0		
Operating voltage	30 V_{DC} (18 ... 31,6 V)		
Max. current consumption	420 mA		80 mA
Max. current consumption without sensor/actuator supply	100 mA		80 mA
AUX			
Voltage	–		24 V_{DC} (20 ... 30 V) (PELV) [5]
Max. current consumption	–		6 A max.
Input			
Number	6-8 x 2 channels safe inputs (SIL3, cat. 4, PLe) for floating contacts, OSSDs or complementary switches [2]		
	up to 16 standard inputs [2]		
Switching current	15 mA (T = 100µs), continuously 4 mA at 24 V		
Power supply	out of ASi		out of AUX
Max. current for OSSD	Σ (In/Out)<320 mA		Σ (In)<1,5 A
OSSD test pulses	0 ... 50 Hz		
OSSD test pulse width	0 ... 1 ms		
input level	10 mA, R < 150 Ω		
Output			
Number	up to 2 release circuits; up to 2 x electronic safe outputs [2]		
	up to 16 standard outputs [2]		
Power supply	out of ASi		out of AUX
Max. output current	Σ (In/Out)<320 mA		max. 2 A per output, Σ (Out)<4 A
Test pulse	if output is on: minimum interval between 2 test pulses: 250 ms, pulse width: 1 ms		
Display			
LEDs S11/S12 ... S81/S82 (yellow)	state of safe input channels S11/S12 ... S81/S82 [2]		
LED SO1, SO2 (yellow)	state of safe outputs SO1, SO2 [2]		
LED ASI (green)	on: ASi voltage on flashing: ASi voltage on, but peripheral fault [3] or address 0 off: no ASi voltage		
LED FLT/FAULT (red)	on: slave address 0 or slave off line flashing: peripheral fault [3] off: slave on line		
LED AUX (green)	–		on: 24 V_{DC} AUX off: no 24 V_{DC} AUX
LED MP (green / yellow / red)	off: no memory plug plugged in or memory plug defect green: memory plug plugged in and recognized yellow flashing: copying configuration from memory plug to unconfigurated module or from module to empty memory plug red: configuration on memory plug and device different [3] or configuration on memory plug incompatible with the device		

ASi Safety I/O Module, IP67, M12, 6-8SI/2SO/16I/16O

Article no.	BWU3499	BWU3489	BWU3490
Environment			
Applied standards	EN 61000-2 EN 61000-3 EN 61131-2 EN 62061 EN ISO 13849-1 EN 60529		
Operating altitude	max. 2000 m		
Ambient operating temperature	0 °C ... +55 °C		
Storage temperature	-25 °C ... +85 °C		
Housing	plastic, for screw mounting		
Pollution Degree	2		
Protection category	IP67 [4]		
Tolerable loading referring to humidity	according to EN 61131-2		
Max. tolerable shock load	30g, 11 ms, acc. EN 61131-2		
Max. tolerable vibration stress	5 ... 8 Hz 50 mm$_{pp}$/8 ... 500 Hz 6g, acc. EN 61131-2		
Voltage of insulation	≥500 V		
Weight	225 g		
Dimension (W / H / D in mm)	60 / 151 / 46		

[1]   loop resistance ≤150 Ω

[2]   siehe "Configuration options of connections of BWU3489, BWU3490, BWU3499"

[3]   See table "Peripheral fault indication"

[4]   IP67 can only be achieved if all open M12 sockets are sealed with suitable protection caps (see accessories).

[5]   The ground connection of the 24 V power supply, which supplies auxiliary power (AUX), must be grounded!

Article no.	Peripheral fault indication			
	Cross connection	Overload output	AUX voltage missing	configuration on memory plug and device different
BWU3489	•	•	–	•
BWU3490	•	•	•	•
BWU3499	•	•	–	•

UL-specifications (UL 61010) BWU3489, BWU3490, BWU3499	
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.

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Configuration options of connections of
BWU3489, BWU3490, BWU3499

Connection	Safe electronic output	2 channels safe input			2 standard inputs / 2 standard output
		for floating contacts	for complementary switches	for OSSDs	
S11/S12	–	●	●	●	●/● [1]
S21/S22	–	●	●	●	●/●
S31/S32	–	●	●	●	●/●
S41/S42	–	●	●	●	●/●
S51/S52	–	●	●	●	●/●
S61/S62	–	●	●	●	●/●
SO1 [2]; S71/S72	●	●	●	●	●/●
SO2 [2]; S81/S82	●	●	●	●	●/●

[1] The safe output of Slave 1 can be configured as a standard output by setting parameter P0=0.

[2] If outputs are configured as inputs, the input current has to be limited by an external element at ≤100 mA
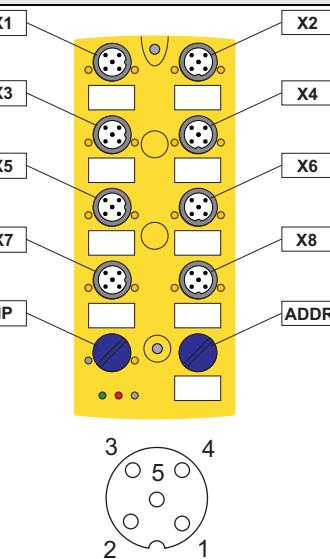
Pin assignment

| Signal name	Explanation
Sx1/Sx2	safe input x, configurable for floating contacts or OSSDs reps. as standard inputs (standard)
Ix	standard input x
Ox	standard output x
SOx	safe electronic output x
T1, T2	clokc output
$24V_{ext\ out}$	power supply, out of external voltage, positive pole (AUX, actuator supply)
$0V_{ext\ out}$	power supply, out of external voltage, negative pole (AUX, actuator supply)
$24V_{out\ of\ ASi}$	power supply, out of ASi, positive pole (sensor supply)
$0V_{out\ of\ AS-}$	power supply, out of ASi, negative pole (sensor supply)
ASi+, ASi-	connection to ASi bus
n.c. (not connected)	not connected

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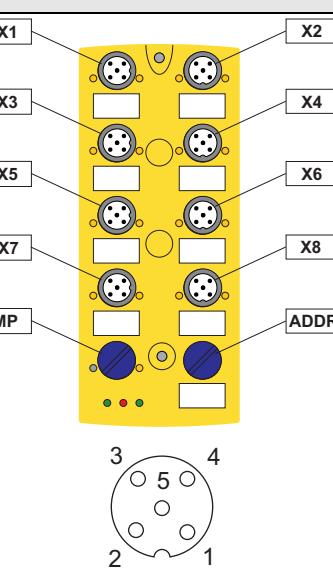
Connections

Article no.	M12 connect.	Marking	Configuration	Pin1	Pin2	Pin3	Pin4	Pin5	
BWU3489	X1	S11/S12	standard.in/diag.out	O2/ 24 V$_{out of ASi}$	I2	0 V$_{out of ASi}$	I1	O1	
			float. cont.	T2	S12	n.c.	S11	T1	
			OSSD	24 V$_{out of ASi}$	S12	0 V$_{out of ASi}$	S11	Reset	
	X2	S21/S22	standard.in/diag.out	O4/ 24 V$_{out of ASi}$	I4	0 V$_{out of ASi}$	I3	O3	
			float. cont.	T2	S22	n.c.	S21	T1	
			OSSD	24 V$_{out of ASi}$	S22	0 V$_{out of ASi}$	S21	Reset	
	X3	S31/S32	standard.in/diag.out	O6/ 24 V$_{out of ASi}$	I6	0 V$_{out of ASi}$	I5	O5	
			float. cont.	T2	S32	n.c.	S31	T1	
			OSSD	24 V$_{out of ASi}$	S32	0 V$_{out of ASi}$	S31	Reset	
	X4	S41/S42	standard.in/diag.out	O8/ 24 V$_{out of ASi}$	I8	0 V$_{out of ASi}$	I7	O7	
			float. cont.	T2	S42	n.c.	S41	T1	
			OSSD	24 V$_{out of ASi}$	S42	0 V$_{out of ASi}$	S41	Reset	
	X5	S51/S52	standard.in/diag.out	O10/ 24 V$_{out of ASi}$	I10	0 V$_{out of ASi}$	I9	O9	
			float. cont.	T2	S52	n.c.	S51	T1	
			OSSD	24 V$_{out of ASi}$	S52	0 V$_{out of ASi}$	S51	Reset	
	X6	S61/S62	standard.in/diag.out	O12/ 24 V$_{out of ASi}$	I12	0 V$_{out of ASi}$	I11	O11	
			float. cont.	T2	S62	n.c.	S61	T1	
			OSSD	24 V$_{out of ASi}$	S62	0 V$_{out of ASi}$	S61	Reset	
	X7	SO1	safety out	n.c.	SO1-	0 V$_{out of ASi}$	SO1+	n.c.	
			standard.in/diag.out	O14/ 24 V$_{out of ASi}$	I14	0 V$_{out of ASi}$	I13	O13	
			float. cont.	T2	S72	n.c.	S71	T1	
			OSSD	24 V$_{out of ASi}$	S72	0 V$_{out of ASi}$	S71	Reset	
	X8	SO2	safety out	n.c.	SO2-	0 V$_{out of ASi}$	SO2+	n.c.	
			standard.in/diag.out	O16/ 24 V$_{out of ASi}$	I16	0 V$_{out of ASi}$	I15	O15	
			float. cont.	T2	S82	n.c.	S81	T1	
			OSSD	24 V$_{out of ASi}$	S82	0 V$_{out of ASi}$	S81	Reset	
	ADDR		connection for ASi addressing device (dummy plug)						
	MP		memory plug (dummy plug)						

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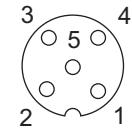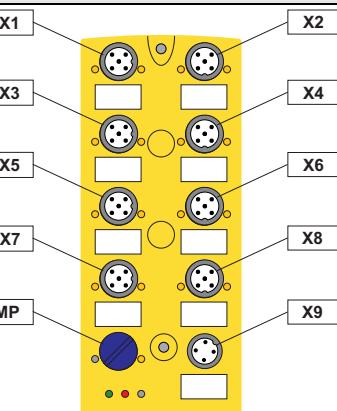
Connections

Article no.	M12 connect.	Marking	Configuration	Pin1	Pin2	Pin3	Pin4	Pin5
BWU3490	X1	S11/S12	standard.in/diag.out	O2/24 $V_{ext.out}$	I2	0 $V_{ext.out}$	I1	O1
			float. cont.	T2	S12	n.c.	S11	T1
			OSSD	24 $V_{ext.out}$	S12	0 $V_{ext.out}$	S11	Reset
	X2	S21/S22	standard.in/diag.out	O4/24 $V_{ext.out}$	I4	0 $V_{ext.out}$	I3	O3
			float. cont.	T2	S22	n.c.	S21	T1
			OSSD	24 $V_{ext.out}$	S22	0 $V_{ext.out}$	S21	Reset
	X3	S31/S32	standard.in/diag.out	O6/24 $V_{ext.out}$	I6	0 $V_{ext.out}$	I5	O5
			float. cont.	T2	S32	n.c.	S31	T1
			OSSD	24 $V_{ext.out}$	S32	0 $V_{ext.out}$	S31	Reset
	X4	S41/S42	standard.in/diag.out	O8/24 $V_{ext.out}$	I8	0 $V_{ext.out}$	I7	O7
			float. cont.	T2	S42	n.c.	S41	T1
			OSSD	24 $V_{ext.out}$	S42	0 $V_{ext.out}$	S41	Reset
	X5	S51/S52	standard.in/diag.out	O10/24 $V_{ext.out}$	I10	0 $V_{ext.out}$	I9	O9
			float. cont.	T2	S52	n.c.	S51	T1
			OSSD	24 $V_{ext.out}$	S52	0 $V_{ext.out}$	S51	Reset
	X6	S61/S62	standard.in/diag.out	O12/24 $V_{ext.out}$	I12	0 $V_{ext.out}$	I11	O11
			float. cont.	T2	S62	n.c.	S61	T1
			OSSD	24 $V_{ext.out}$	S62	0 $V_{ext.out}$	S61	Reset
	X7	SO1	safety out	n.c.	SO1-	0 $V_{ext.out}$	SO1+	n.c.
			standard.in/diag.out	O14/24 $V_{ext.out}$	I14	0 $V_{ext.out}$	I13	O13
			float. cont.	T2	S72	n.c.	S71	T1
			OSSD	24 $V_{ext.out}$	S72	0 $V_{ext.out}$	S71	Reset
	X8	SO2	safety out	n.c.	SO2-	0 $V_{ext.out}$	SO2+	n.c.
			standard.in/diag.out	O16/24 $V_{ext.out}$	I16	0 $V_{ext.out}$	I15	O15
			float. cont.	T2	S82	n.c.	S81	T1
			OSSD	24 $V_{ext.out}$	S82	0 $V_{ext.out}$	S81	Reset
	ADDR		connection for ASi addressing device (dummy plug)					
	MP		memory plug (dummy plug)					

Connections

Article no.	M12 connect.	Marking	Configuration	Pin1	Pin2	Pin3	Pin4	Pin5	
BWU3499	**X1**	S11/S12	standard.in/diag.out	O2/ 24 V$_{out of ASi}$	I2	0 V$_{out of ASi}$	I1	O1	
			float. cont.	T2	S12	n.c.	S11	T1	
			OSSD	24 V$_{out of ASi}$	S12	0 V$_{out of ASi}$	S11	Reset	
	X2	S21/S22	standard.in/diag.out	O4/ 24 V$_{out of ASi}$	I4	0 V$_{out of ASi}$	I3	O3	
			float. cont.	T2	S22	n.c.	S21	T1	
			OSSD	24 V$_{out of ASi}$	S22	0 V$_{out of ASi}$	S21	Reset	
	X3	S31/S32	standard.in/diag.out	O6/ 24 V$_{out of ASi}$	I6	0 V$_{out of ASi}$	I5	O5	
			float. cont.	T2	S32	n.c.	S31	T1	
			OSSD	24 V$_{out of ASi}$	S32	0 V$_{out of ASi}$	S31	Reset	
	X4	S41/S42	standard.in/diag.out	O8/ 24 V$_{out of ASi}$	I8	0 V$_{out of ASi}$	I7	O7	
			float. cont.	T2	S42	n.c.	S41	T1	
			OSSD	24 V$_{out of ASi}$	S42	0 V$_{out of ASi}$	S41	Reset	
	X5	S51/S52	standard.in/diag.out	O10/ 24 V$_{out of ASi}$	I10	0 V$_{out of ASi}$	I9	O9	
			float. cont.	T2	S52	n.c.	S51	T1	
			OSSD	24 V$_{out of ASi}$	S52	0 V$_{out of ASi}$	S51	Reset	
	X6	S61/S62	standard.in/diag.out	O12/ 24 V$_{out of ASi}$	I12	0 V$_{out of ASi}$	I11	O11	
			float. cont.	T2	S62	n.c.	S61	T1	
			OSSD	24 V$_{out of ASi}$	S62	0 V$_{out of ASi}$	S61	Reset	
	X7	SO1	safety out	n.c.	SO1-	0 V$_{out of ASi}$	SO1+	n.c.	
			standard.in/diag.out	O14/ 24 V$_{out of ASi}$	I14	0 V$_{out of ASi}$	I13	O13	
			float. cont.	T2	S72	n.c.	S71	T1	
			OSSD	24 V$_{out of ASi}$	S72	0 V$_{out of ASi}$	S71	Reset	
	X8	SO2	safety out	n.c.	SO2-	0 V$_{out of ASi}$	SO2+	n.c.	
			standard.in/diag.out	O16/ 24 V$_{out of ASi}$	I16	0 V$_{out of ASi}$	I15	O15	
			float. cont.	T2	S82	n.c.	S81	T1	
			OSSD	24 V$_{out of ASi}$	S82	0 V$_{out of ASi}$	S81	Reset	
	X9	ASi		ASi+	n.c.	ASi-	n.c.	–	
	MP		memory plug (dummy plug)						

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Programming instructions (bit assignment of standard I/O slaves)

Bit	ASi bit assignment			
	D3	D2	D1	D0
input				
Slave 1	I4	I3	I2	I1
Slave 2	I8	I7	I6	I5
Slave 3	I12	I11	I10	I9
Slave 4	I16	I15	I14	I13
output				
Slave 1	O4	O3	if P0=1: X8 output: SO2 if P0=0: X1 output: O2	if P0=1: X7 output: SO1 if P0=0: X1 output: O1
Slave 2	O8	O7	O6	O5
Slave 3	O12	O11	O10	O9
Slave 4	O16	O15	O14	O13
parameter bit				
	P3	P2	P1	P0
Slave 1	free	free	free	P0=1: SOx can be switch off via the output bit. O2 = +24V; O1 = 0V P0=0: no influence on SOx
Slave 2	free	free	free	free
Slave 3	free	free	free	free
Slave 4	free	free	free	free

Programming instructions (bit assignment of safety input slaves 1…8)

Bit	ASi bit assignment			
	D3	D2	D1	D0
input				
safety input slave	Sx2		Sx1	
output				
	free	if OSSD: reset (Pin 5)	free	free
parameter bit				
	P3	P2	P1	P0
	free	free	free	free

Programming instructions (bit assignment of diagnostic slaves 1 and 2)
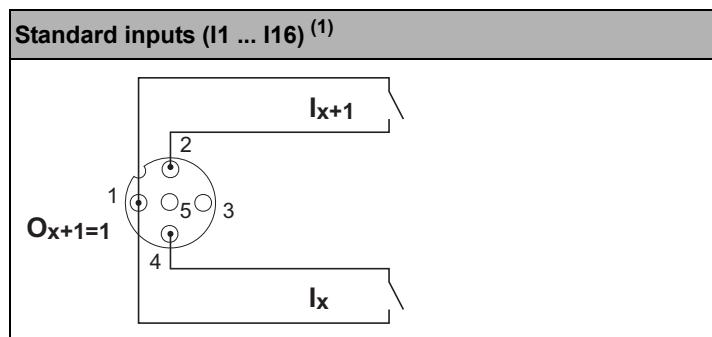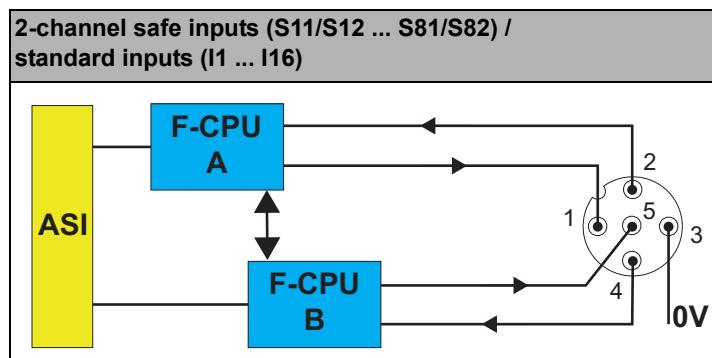
Bit		ASi bit assignment		
	D3	D2	D1	D0
input				
diagnostic slave	I3	diagnsotics (see table device colors)		
output				
	free	free	free	O0
parameter bit				
	P3	P2	P1	P0
	free	P2=1: feedback input Ix (x=1, 3) at I3 P2=0: feedback of release conditions at I3	P1=1: not used P1=0: if O0=0, the safe output SOx (n=1, 2) will be switched off, regardless of the release	free

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Release conditions
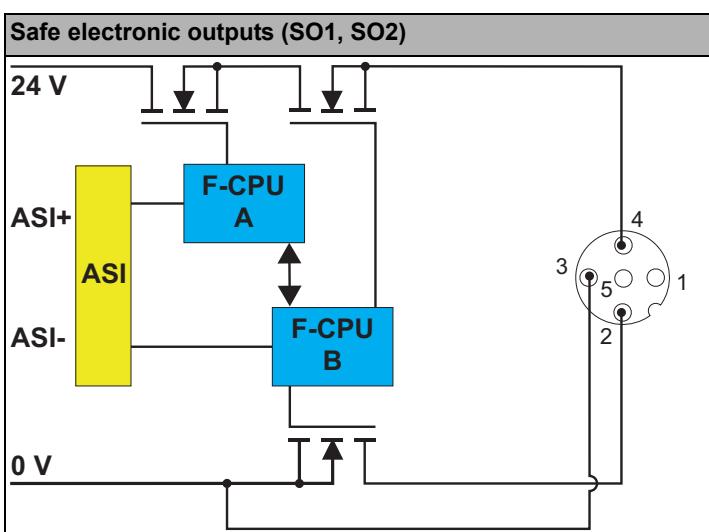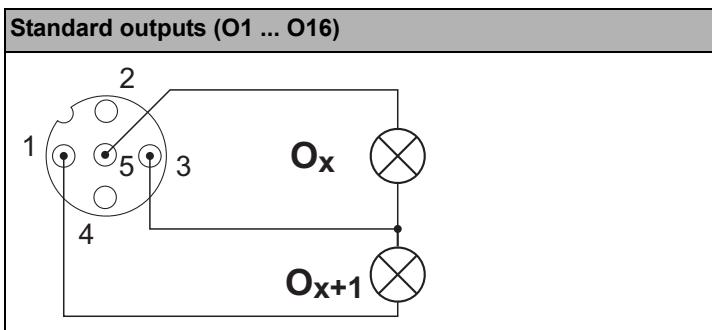
Diagnostic slaves	Slave 1 and 2		Standard I/O slaves		
			Slave 1		
			Parameter P0 = 0	Parameter P0 = 1	
				Bit $D_{x-1} = 0$	Bit $D_{x-1} = 1$
	Parameter P1 = 1		SOx = release	SOx = off	SOx = release
	Parameter P1 = 0	Bit O0 = 1	SOx = release	SOx = off	SOx = release
		Bit O0 = 0	SOx = off	SOx = off	SOx = off

Diagnostics (device colors)

Value	Color	Description	State change	LED SOx
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 is 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

2-channel safe inputs (S11/S12 ... S81/S82) / standard inputs (I1 ... I16)

Standard inputs (I1 ... I16) [1]

[1] Ox+1 must remain on so that 24V is present on Pin 1.

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Standard outputs (O1 ... O16)

Safe electronic outputs (SO1, SO2)

LED status display

LED	State	Signal / Description
AUX (green)	○	no 24 V_{DC} AUX
	☀	24 V_{DC} AUX present
ASI (green)	○	no ASi voltage
	☼ 1 Hz	ASi voltage present, but at least one ASi slave is addressed „0" or peripheral fault
	☀	ASi voltage present
FLT (red)	○	ASi communication OK (at least one ASi slave on line)
	☼ 1 Hz	at least one ASi slave with peripheral fault
	☀	no data exchange (with at least one correctly addressed ASi slave)
MP (green / yellow / red)	○	no memory plug plugged in or memory plug defect
	☼ 1 Hz	copying configuration from memory plug to unconfigured module or from module to empty memory plug
	☀	memory plug plugged in and recognized
	☀	configuration on memory plug and device different or configuration incompatible with the device, user intervention is required.

LED	State	Signal / Description
S11/S12 ... S81/S82 (yellow)	⊘	safety input channel is switched off
	☀ 1 Hz	cross-connection
	☀ 8 Hz	internal error or double address
	☀	safety input channel is switched on
SO1, SO2 (yellow)	⊘	safety output is switched off
	☀ 1 Hz	restart block, waiting for the start signal to switch on the safety output again
	☀ 8 Hz	unlockable error state; waiting for "reset of error condition signal", after receiving the signal the device turns into normal operation
	☀	safety output is switched on
☀ 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 disconnection of the power supply (Power ON Reset).

Accessories:

- **Bihl-Wiedemann Suite - Safety Software for Configuration, Diagnostics and Programming (art. no. BW2916)**
- **ASi substructure module (CNOMO) for 8 channel module in 60 mm housing (art. no. BW2351)**
- **Memory Plug, memory capacity 32 kByte (art. no. BW3241)**
- **Protection caps for unused M12 sockets (art. no. BW2368)**
- **Memory plug cover (art. no. BW3155)**
- **Sealing profile IP67 (IDC plug), 60 mm (art. no. BW3282)**

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