Analog Modules AS-i IP20

(Figure similar)

Figure	Type	Inputs analog	Outputs analog	Input voltage (sensor supply) (1)	Output voltage (actuator supply) (2)	AS-i address (3)	Art. no.
	IP20, 22,5 mm x 92 mm 4 x COMBICON	2 x 4 ... 20 mA / 0 ... 10 V	–	selectable, from AS-i or AUX, default AS-i	–	1 AB slave	**BWU1897**
	IP20, 22,5 mm x 92 mm 4 x COMBICON	2 x 4 ... 20 mA / 0 ... 10 V	–	selectable, from AS-i or AUX, default AS-i	–	1 single slave	**BWU1345**
	IP20, 22,5 mm x 92 mm 4 x COMBICON	–	2 x 0 ... 20 mA / 0 ... 10 V	–	selectable, from AS-i or AUX, default AS-i	1 single slave	**BWU1412**
	IP20, 22,5 mm x 92 mm 4 x COMBICON	–	2 x 0 ... 20 mA / 0 ... 10 V	–	selectable, from AS-i or AUX, default AS-i	1 single slave	**BWU1727**
	IP20, 22,5 mm x 92 mm 4 x COMBICON	–	2 x -10 V ... +10 V	–	out of AUX	1 single slave	**BWU2224**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	4 x 4 ... 20 mA	–	from AS-i or AUX, auto switching	–	1 single slave	**BWU1364**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	4 x 0 ... 10 V	–	from AS-i or AUX, auto switching	–	1 single slave	**BWU1365**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	4 x Pt100	–	out of AS-i	–	1 single slave	**BWU1368**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	4 x thermocouple type J	–	out of AS-i	–	1 single slave	**BWU1933**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	4 x thermocouple type K	–	out of AS-i	–	1 single slave	**BWU2243**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	–	4 x 0 ... 20 mA	–	from AS-i or AUX, auto switching	1 single slave	**BWU1366**
	IP20, 22,5 mm x 105 mm 6 x COMBICON	–	4 x 0 ... 10 V	–	from AS-i or AUX, auto switching	1 single slave	**BWU1367**

(1) I**nput 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 address:** 1 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.
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 AS-i Slave profiles.

Article No.	BWU1897	BWU1345	BWU1364	BWU1365	BWU1368	BWU1933 BWU2243
General Data						
Device type	Input					
Connection						
AS-i/AUX connection	COMBICON clamp					
Periphery connection	COMBICON clamp					
AS-i						
Profile	S-7.A.9	S-7.3				
Address	1 AB slave	1 single slave				
Required Master profile	≥ M4	≥ M3				
Since AS-i specification	3.0	2.1				
Operating voltage	30 V (18 … 31,6 V)	30 V (19 V ... 31,6 V)	30 V (24 … 31,6 V)	30 V (18 … 31,6 V)		
Max. current consumption	< 80 mA					< 100 mA
AUX						
Voltage	–					
Max. current consumption	–					
Input						
Resolution	14 Bit (1 µA / 1mV)	16 Bit (1 µA / 1 mV)	16 Bit (1 µA)	16 Bit (1 mV)	16 Bit (0,1 °C)	16 Bit (0,1 °C)
Range of value	4000 ... 20000 dec. / 0 ... 10000 dec.		4000 ... 20000 dec.	0 ... 10000 dec.	-200 °C ... +850 °C	-200 °C ... +760 °C
Internal resistance	50 Ω / 100 kΩ				–	1 MΩ
Max. input voltage	25 V				–	
Max. input current	40 mA				–	
Power supply of attached sensors	out of AS-i or out of AUX				out of AS-i	
Output						
Resolution	–					
Range of value	–					
Resistance of the actuators	–					
Max. output current	–					
Power supply	–					
Environment						
Applied standards	EN 61000-6-2 EN 61000-6-4 EN 60529					
Operating altitude	max. 2000 m					
Operating temperature	0 °C … +70 °C					
Storage temperature	-25 °C … +85 °C					
Housing	plastic, for DIN rail mounting					
Protection category	IP20					
Voltage of insulation	≥ 500 V					
Weight	120 g		145 g			
Dimension (W / H / D in mm)	22,5 / 99 / 92		22,5 / 105 / 114			

Article No.	BWU1366	BWU1367	BWU1412	BWU1727	BWU2224
General Data					
Device type	output				
Connection					
AS-i/AUX connection	COMBICON clamps				
Periphery connection	COMBICON clamps				
AS-i					
Profile	S-7.3				S-7.3.5
Address	1 single slave				
Required Master profile	≥ M3				
Since AS-i specification	2.1				
Operating voltage	30 V (24 … 31,6 V)	30 V (18 … 31,6 V)			
Max. current consumption	< 80 mA				< 100 mA
AUX					
Voltage	–				18 .. 30 V
Max. current consumption	–				100 mA
Input					
Resolution	–				
Range of value	–				
Internal resistance	–				
Max. input voltage	–				
Max. input current	–				
Power supply of attached sensors	–				
Output					
Resolution	16 Bit (1 µA)	16 Bit (1 mV)	16 Bit (1 µA / 1 mV)		16 Bit
Range of value	0 ... 20000 dec.	0 ... 10000 dec.	0 ... 20000 dec. / 0 ... 10000 dec.		-10000 ... +10000 dec.
Resistance of the actuators	–				≥ 1 kΩ
Max. output current	–				10 mA
Power supply	out of AS-i or out of AUX				out of AUX
Environment					
Applied standards	EN 61000-6-2 EN 61000-6-4 EN 60529				
Operating altitude	max. 2000 m				
Operating temperature	0 °C … +70 °C				0 °C … +60°C
Storage temperature	-25 °C … +85 °C				
Housing	plastic, for DIN rail mounting				
Protection category	IP20				
Voltage of insulation	≥ 500 V				
Weight	145 g		120 g		145 g
Dimension (W / H / D in mm)	22,5 / 105 / 114		22,5 / 99 / 92		22,5 / 105 / 114

Programming of input					
Bit setting	**Article No.**				
	BWU1345	**BWU1364 BWU1365**	**BWU1368**	**BWU1897**	**BWU1933 BWU2243**
P0:					
0: 60 H filter in A/D converter active 1: 50 H filter in A/D converter active	•	•	•	•	•
P1:					
0: normal operation 1: both channels in current mode and without broken wire recognition	–	–	–	•	–
0: channel 2 is not projected 1: channel 2 is projected	•	–	–	–	–
Analog module is switched on-/off (bit combination P1 and P2)	–	•	–	–	–
A peripheral fault can be released through channel X (bit combination P1 and P2)	–	–	•	–	•
P2:					
1: peripheral fault is indicated 0: peripheral fault is not indicated	•	–	–	•	–
Analog modul is switched on-/off (bit combination P1 and P2)	–	•	–	–	–
A peripheral fault can be released through channel X (bit combination P1 and P2)	–	–	•	–	•
P3:					
0: both channels in current mode and without broken wire recognition 1: normal operation	•	–	–	–	–
0: peripheral fault is indicated 1: peripheral fault is not indicated	–	•	–	–	–
0: 4 wire-mode 1: 2 wire-mode	–	–	•	–	–
0: external cold-junction compensation 1: internal cold-junction compensation	–	–	–	–	•

Combination of input bits P1 and P2

BWU1364, BWU1365, BWU1933, BWU2243

Channel c.X is

P1	P2	c.1	c.2	c.3	c.4
0	0	on	off	off	off
0	1	on	on	off	off
1	0	on	on	on	off
1	1	on	on	on	on

BWU1368

Peripheral fault can be released through channel

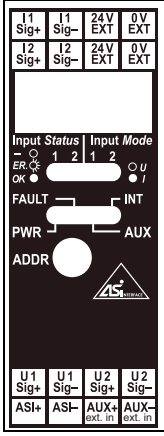
P1	P2	1	2	3	4
0	0	yes	no	no	no
0	1	yes	yes	no	no
1	0	yes	yes	yes	no
1	1	yes	yes	yes	yes

Programming of output			
Bit setting	**Article No.**		
	BWU1366, BWU1367	**BWU1412, BWU1727**	**BWU2224**
P0:			
0: mode of channel 1 and 2 (bit combination P1 and P3) 1: automatic mode recognition	–	•	–
0: profile is not monitored 1: profile is monitored1:	•	–	–
P1:			
0: channel 1 is in mode voltage module 1: channel 1 is in mode current module	–	•	–
P2:			
0: peripheral fault is not indicated 1: peripheral fault is indicated	•	•	•
P3:			
0: channel 2 is in mode voltage module 1: channel 2 is in mode current module	–	•	–

Programming notes						
Article no.	**ID Code**	**ID1 Code**			**ID2 Code**	**IO Code**
BWU1345	3_{hex}	–			D_{hex}	7_{hex}
BWU1364, BWU1365, BWU1368, BWU1933, BWU2243	3_{hex}	–			E_{hex}	7_{hex}
BWU1366, BWU1367	3_{hex}	–			6_{hex}	7_{hex}
BWU1412, BWU1727	3_{hex}	–			5_{hex}	7_{hex}
BWU1897 (1)	A_{hex}	**Code-Definition**			9_{hex}	7_{hex}
		ID1	14 bit	12 Bit		
		channel 1	0; 2; 3	1		
		channel 1 and 2	4; 5; 7 (default)	6		
BWU2224	3_{hex}	F_{hex} (default)			5_{hex}	7_{hex}

(1) BWU1897 can transfer either 12 or 14 bit-values. Via ID1 the data capacity and the channel number can be defined.

Connections BWU1345



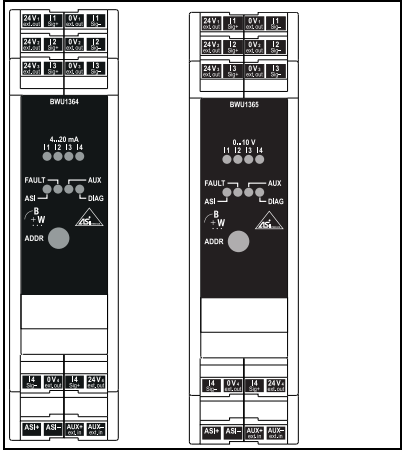
LEDs BWU1345	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
AUX (green)	Voltage supply 24 V for the analog part
INT (green)	Voltage supply for the analog part out of AS-i
Analog 1 (green)	State of channel 1
Analog 2 (green)	State of channel 2
Analog 1 (green)	On: current measurement; off: voltage measurement
Analog 2 (green)	On: current measurement; off: voltage measurement

Current or voltage modules can be attached over different clamps. The current supply of the sensors can take place depending upon position of a slide switch from AS-i or from external voltage (after PELV). With the help of a 2. slide switch the 2. channel in favor of faster data communication can be switched off. The position of the slide switches is indicated over LEDs.
Supplying external loads:

- by supply out of AS-i: 50 mA max.
- y external supply: 500 mA max. (750 mA fuse)

Attention: no PE connection at 24 V ext supply!

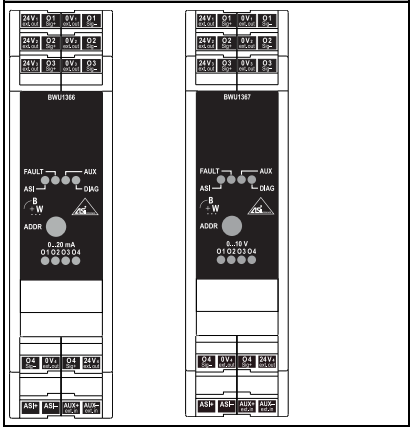
Connections BWU1364, BWU1365



LEDs BWU1364, BWU1365	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
AUX (green)	Voltage supply 24 V for the analog part
DIAG (green)	Diagnosis
I1 ... I4 (green)	State of channel I1, I2, I3, I4

The current supply of the sensors can be made out of AS-i or an external voltage supply (according to PELV). The current supply switches automatically to the supply out of external voltage supply, as soon as an external voltage is connected.
The analog sensors and AS-i are galvanically separated.

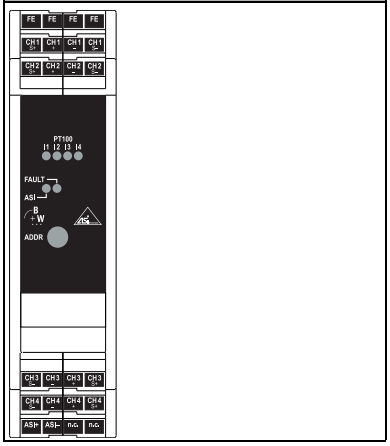
Connections BWU1366, BWU1367



LEDs BWU1366, BWU1367	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
AUX (green)	Voltage supply 24 V for the analog part
DIAG (green)	Diagnosis
O1 ... O4 (green)	State of channel O1, O2, O3, O4

The current supply of the actuators can made out of AS-i or an external voltage supply (according to PELV). The current supply switches automatically to the supply out of external voltage supply, as soon as an external voltage is connected.
The actuators and AS-i are galvanically separated.

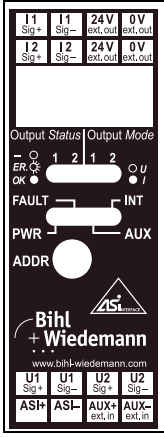
Connections BWU1368



LEDs BWU1368	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
I1 ... I4 (yellow)	State of channel I1, I2, I3, I4

The measuring sensors and AS-i are galvanically separated.

Connections BWU1412, BWU1727, BWU1897

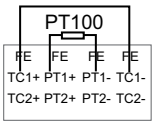


LEDS BWU1412, BWU1727, BWU1897	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
AUX (green)	Voltage supply 24 V for the analog part
INT (green)	Voltage supply for the analog part out of AS-i
Analog 1 (green)	State of channel 1
Analog 2 (green)	State of channel 2
Analog 1 (green)	Channel 1: on: current measurement; off: voltage measurement
Analog 2 (green)	Channel 2: on: current measurement; off: voltage measurement

Current or voltage modules can be attached over different clamps. The current supply of the actuators can take place depending upon position of a slide switch from AS-i or from external voltage (after PELV). The position of the slide switch is indicated over LEDs.
BWU1897: With the help of a 2. slide switch the 2. channel in favor of faster data communication can be switched off.
Attention: no PE connection at 24 V aux. supply!

Connections BWU1933, BWU2243

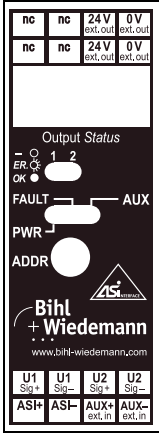
Terminal connections BWU1933, BWU2243	
FE	Functional earth
TCx±	Thermo element +/– (inputs 1 - 4)
PTx±	PT100 +/– (External cold junction compensation)
AS-i±	AS-Interface +/–
n.c.	Not connected



The inputs ch. 2, ch. 3 and ch 4 are connected with a bridge and a resistor (in default state) to become a valid input value and to avoid peripheral faults.
This can also be obtained by setting the paramater P1 and P2.
The temperature is measured using cold junction temperature compensation. The analog sensors are galvanical separated to AS-i. For internal compensation the peripheral fault can be caused by a broken wire of the thermocouple. For the external compensation (Pt100 in connectors 2 and 3) the peripheral fault can also be caused by a broken wire or a short circuit of the Pt100 element. A short circuit of the TC cannot be recognized as an error.
Note:
Precise cold junction compensation requires vertical mounting and natural air circulation. A clearance of at least 5 cm each side is required!

LEDs BWU1933, BWU2243	
PWR (green)	AS-i voltage
FAULT (red)	AS-i communication error, peripheral fault
In1 ... In4 (yellow)	State of channel I1, I2, I3, I4

Connections BWU2224



LEDs BWU2224	
PWR (green)	AS-i voltage
FAULT (red)	On: AS-i communication error; flashing: peripheral fault
AUX (green)	Voltage supply 24 V for the analog part
1 (yellow)	State of channel 1
2 (yellow)	State of channel 2

$U1_{Sig.-}$ and $U2_{Sig.-}$ connected.
The outputs are short circuit. The output channels have a common reference potential. The actuators are controlled from separate 24 V and they are galvanically isolated from AS-i and AUX.