

# ASi-5 Counter Module, IP67, M12

## New standard ASi-5

Counter input module configurable as:

- 4 x 2-channel input
- or
- 4 x 1-channel input


A/B inputs

Impulse counter

High protection category IP67



(Figure similar)

Figure	Type	Housing	Inputs digital	Range of values	Counting rate	Input voltage (sensor supply) <sup>(1)</sup>	ASi connection <sup>(2)</sup>	ASi address <sup>(3)</sup>	Article no.
	IP67, 4 x M12, ASi-5	4 x M12	4 x counter inputs	impulse: -32768 ... 32767 dec.	max. 250 kHz	out of ASi	ASi profile cable	1 ASi-5 Slave	<b>BWU4042</b>

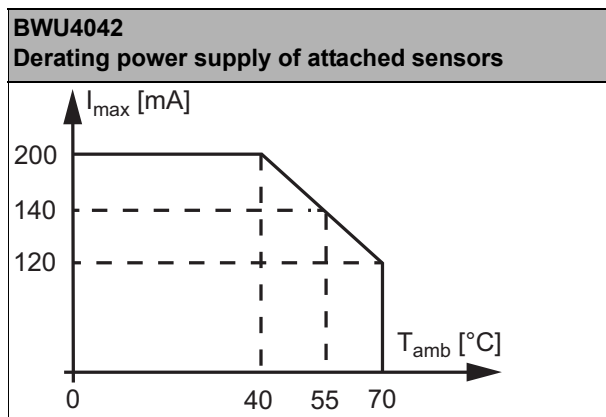
- (1) **Input voltage (sensor supply):** Inputs are supplied by ASi or by AUX (auxiliary 24 V power). If supplied by ASi, inputs shall not be connected to earth or to external potential.
- (2) **ASi connection:** The connection to ASi as well to AUX (auxiliary 24 V power) is made via yellow resp. black ASi profile cable with piercing technology or via M12 socket (in IP20 via clamps).
- (3) **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), ASi-5 Slave (max. 62 ASi-5 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.

<b>Article No.</b>		<b>BWU4042</b>
<b>General data</b>		
Device type		counter input
<b>Connection</b>		
ASi connection		profile cable and piercing
Periphery connection		M12
Length of connector cable		I/O: 20 m <sup>(1)</sup>
<b>ASi</b>		
Address		1 ASi-5 slave
Required master profile		M5
Since AS-i specification		5
Operating voltage		30 V (18 ... 31.6 V)
Max. current consumption		245 mA
Max. current consumption without sensor/ actuator supply		45 mA
<b>Input</b>		
Number		depending on configuration: 4 x 1-channel 4 x 2-channel
Counting rate		max. 250 kHz
Range of value		impulse: -32768 ... 32767 dec. (start value configurable)
Power supply		out of ASi
Sensor supply		short-circuit and overload protected according to EN 61131-2
Power supply of attached sensors	up to +40 °C	200 mA <sup>(2)</sup>
	at +55 °C	140 mA <sup>(2)</sup>
	at +70 °C	120 mA <sup>(2)</sup>
<b>Display</b>		
LED ASi (green)		on: ASi voltage on flashing: ASi voltage on, but peripheral fault <sup>(3)</sup> or address 0 off: no ASi voltage
LED FAULT (red)		on: slave address 0 or slave offline flashing: peripheral fault <sup>(3)</sup> off: slave online
LED C1A ... CnA (yellow)		<b>1-channel mode</b> on: signal at pulse counter input 1 ... 4 (Pin4) off: no signal
		<b>2-channel mode with 4-times evaluation</b> on: rising/falling edge at channel A of counter input 1 ... 4 (Pin2)
		<b>2-channel mode without 4-times evaluation</b> on: period recognized
LED C1B ... CnB (yellow)		<b>1-channel mode</b> on: status input 1 ... 4 (Pin2) active if bit USE CHx = 1 <sup>(3)</sup> off: status input 1 ... 4 (Pin2) not active if bit USE CHx = 1 <sup>(3)</sup> or bit USE CHx = 0
		<b>2-channel mode with 4-times evaluation</b> on: rising/falling edge at channel B of counter input 1 ... 4 (Pin2)
		<b>2-channel mode without 4-times evaluation</b> no function

<b>Article No.</b>	<b>BWU4042</b>
<b>Environment</b>	
Applied standards	EN 61000-6-2 EN 61000-6-3 EN 61131-2 EN 60529
Passive safety (up to PLe/SIL 3)	yes <sup>(4)</sup>
Operating altitude	max. 2000 m
Ambient temperature	-30 °C ... +55 °C (up to max. +70 °C) <sup>(2) (5)</sup>
Storage temperature	-25 °C ... +85 °C
Housing	plastic, for screw mounting
Pollution degree	2
Protection category	IP67
Tolerable loading referring to humidity	acc. EN 61131-2
Max. tolerable shock load	30g, 11 ms, acc. EN 61131-2
Max. tolerable vibration stress	5 ... 8 Hz 50 mm <sub>pp</sub> /8 ... 500 Hz 6g, acc. EN 61131-2
Insulation voltage	≥ 500 V
Weight	200 g
Dimensions (W / H / D) in mm	45 / 80 / 38 (without substructure)

(1) Loop resistance ≤ 150 Ω

(2)

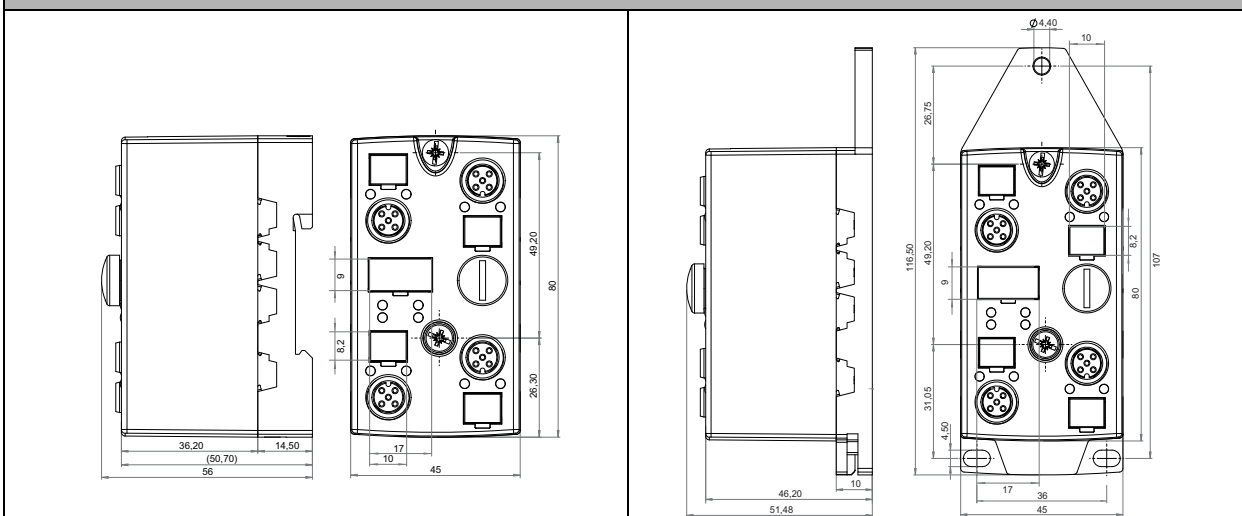


(3) See table "Peripheral fault indication"

(4) Exclusion of errors for the connection of the two ASi and AUX potentials can be assumed in the module. Passive safety for the application can only be achieved if this is ensured for all components used.

(5) Maximum ambient operating temperature +55 °C according UL certificate for the use in the USA and Canada

## Dimensional drawings



Article no.	Peripheral fault indication		
	counter overflow/underflow and RO Chx = 0	input short circuited	status input (Pin2) in 1-channel mode is not active but bit USE CHx = 1
BWU4042	•	•	•

## UL-specifications (UL508)

BWU4042	
External protection	An isolated source with a secondary open circuit voltage of $\leq 30 V_{DC}$ 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.

## Programming (ASi Bit-setting)

Article no.	Byte	Bit							
		D7	D6	D5	D4	D3	D2	D1	D0
		Input							
BWU4042	0	Channel 1 counter value, low byte							
	1	Channel 1 counter value, high byte							
	2	Channel 2 counter value, low byte							
	3	Channel 2 counter value, high byte							
	4	Channel 3 counter value, low byte							
	5	Channel 3 counter value, high byte							
	6	Channel 4 counter value, low byte							
7	Channel 4 counter value, high byte								

Article no.	Byte	Bit							
		D7	D6	D5	D4	D3	D2	D1	D0
		Output							
BWU4042	0	reserved <sup>(1)</sup>	RO Ch1	USE Ch1	4TE Ch1	2C Ch1	CW Ch1	SV Ch1	RS Ch1
	1	Prescaler Index Ch1 (integer) <sup>(2)</sup>							
	2	reserved <sup>(1)</sup>	RO Ch2	USE Ch2	4TE Ch2	2C Ch2	CW Ch2	SV Ch2	RS Ch2
	3	Prescaler Index Ch2 (integer) <sup>(2)</sup>							
	4	reserved <sup>(1)</sup>	RO Ch3	USE Ch3	4TE Ch3	2C Ch3	CW Ch3	SV Ch3	RS Ch3
	5	Prescaler Index Ch3 (integer) <sup>(2)</sup>							
	6	reserved <sup>(1)</sup>	RO Ch4	USE Ch4	4TE Ch4	2C Ch4	CW Ch4	SV Ch4	RS Ch4
7	Prescaler Index Ch4 (integer) <sup>(2)</sup>								

<sup>(1)</sup> Reserved bits have to be set to zero, otherwise an timer error could occur.

(2) see table "Prescaler Index"

Name	Explanation
RO Chx	<b>Rollover:</b> 0 = Counter stops at highest/lowest value in case of overflow/underflow 1 = Counter counts with lowest/highest value in case of overflow/underflow
USE Chx	<b>use Pin2 channel x</b> 0 = in 1-channel mode (pulse counter) Pin2 is ignored 1 = in 1-channel mode (pulse counter) Pin2 is used as status input
4TE Chx	<b>4-times evaluation:</b> 0 = no 4-times evaluation 1 = in the 2-channel counting mode (bit 2C CHx =1) rising and falling edges on both channels are counted separately.
2C Chx	<b>counter mode channel x</b> 0 = 1-channel input counter (pulse counter) 1 = 2-channel input counter (encoder)
CW Chx	<b>direction of rotation channel x</b> 1-channel input counter (bit 2C Chx = 0) 0 = counting upwards 1 = counting downwards 2-channel input counter (bit 2C Chx = 1) 0: CxB before CxA = counting upwards 1: CxA before CxB = counting downwards
SV Chx	<b>start value channel x</b> 0 = start value 0 (default = 0) 1 = start value 1 (default = -32768)
RS Chx	<b>reset channel x</b> RS changes from 0 to 1: counter starts with start value 0 resp. start value 1 RS changes from 1 to 0: counter stops and keeps last value

Article no.	Prescaler Index											
BWU4042	Index (dec)	255	...	8	7	6	5	4	3	2	1	0
	Prescale value	reserved			128	64	32	16	8	4	2	1

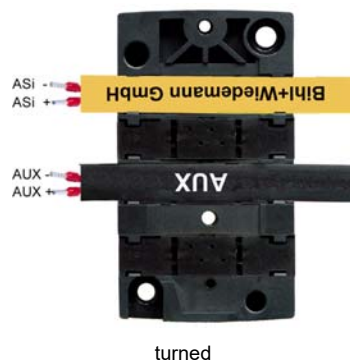
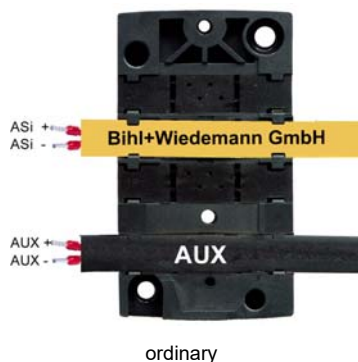
## Pin assignment

Signal name	Explanation
C x channel A, B	counter input x channel A, B (2-channel mode)
Status x	status input x (1-channel mode)
Pulse x+	pulse counter input x, high rise (1-channel mode)
24V <sub>out of ASi</sub>	power supply, out of ASi, positive pole (sensor supply)
0V <sub>out of ASi</sub>	power supply, out of ASi, negative pole (sensor supply)
Shield	shield

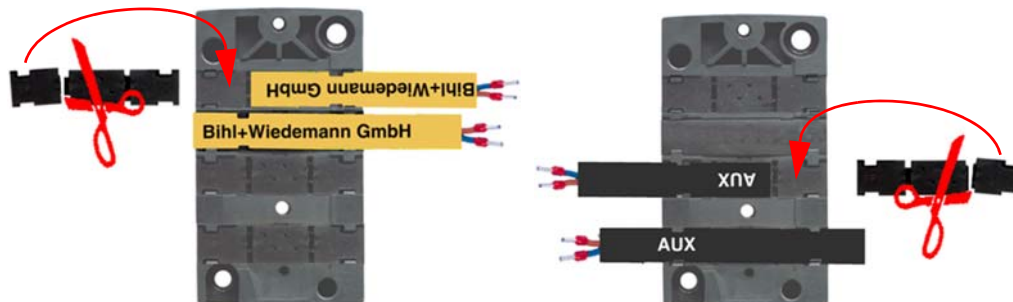
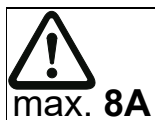
Connections							
Article no.	M12 connection	Marking	Pin1	Pin2	Pin3	Pin4	Pin5
BWU4042	<b>Configuration as: 4 x 2-channel input</b>						
	X1	C1A/C1B	24 V <sub>out of ASi</sub>	C1 Channel B	0 V <sub>out of ASi</sub>	C1 Channel A	n.c.
	X2	C2A/C2B	24 V <sub>out of ASi</sub>	C2 Channel B	0 V <sub>out of ASi</sub>	C2 Channel A	n.c.
	X3	C3A/C3B	24 V <sub>out of ASi</sub>	C3 Channel B	0 V <sub>out of ASi</sub>	C3 Channel A	n.c.
	X4	C4A/C4B	24 V <sub>out of ASi</sub>	C4 Channel B	0 V <sub>out of ASi</sub>	C4 Channel A	n.c.
	ADDR (dummy plug)	connection for ASi addressing device					
	<b>Configuration as: 4 x 1-channel input</b>						
	X1	C1A/C1B	24 V <sub>out of ASi</sub>	Status 1	0 V <sub>out of ASi</sub>	Pulse 1 +	n.c.
	X2	C2A/C2B	24 V <sub>out of ASi</sub>	Status 2	0 V <sub>out of ASi</sub>	Pulse 2 +	n.c.
	X3	C3A/C3B	24 V <sub>out of ASi</sub>	Status 3	0 V <sub>out of ASi</sub>	Pulse 3 +	n.c.
	X4	C4A/C4B	24 V <sub>out of ASi</sub>	Status 4	0 V <sub>out of ASi</sub>	Pulse 4 +	n.c.
	ADDR (dummy plug)	connection for ASi addressing device					

### Mounting according to cable direction



### Line termination with sealing profiles / as junction



### Accessories:

- ASi substructure module for 4 channel module in 45 mm housing (art. no. BWU2349)
- ASi substructure module (CNOMO) for 4 channel module in 45 mm housing (art. no. BWU2350)
- Protection caps for unused M12 sockets (art. no. BW2368)
- Protection caps for ASi-5 addressing socket, IP67, M12 (art. no. BW4056)
- Sealing profile IP67 (IDC plug), 45 mm (art. no. BW3283)