ASi-5 Counter Module, IP67, M12

ASi-5 – Great data bandwidth, short cycle times

(Figure similar)

4 x counter inputs, individually configurable and parameterizable as:

- **4 x 2-channel input**

or

- **4 x 1-channel input**

A/B inputs

Frequency and period duration measurement with and without filtering

Impulse counter and Encoder (24 V)

High protection category IP67

Figure	Housing	Inputs digital	Range of values [1]	Counting rate	Input voltage (sensor supply) [2]	ASi connection [3]	ASi address [4]	Article no.
	4 x M12	4 x counter inputs	impulse: -2147483647 ... 2147483647 dec.	max. 250 kHz	out of ASi	ASi profile cable	1 ASi-5 address	**BWU4042**

(1) From Ident. No. ≥18955, for Ident. No. <18955 range of values -32768 ... 32767 dec.

(2) **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.

(3) **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).

(4) **ASi address:** AB addresses (max. 62 AB addresses/ASi network), 2 AB addresses (max. 31 modules with 2 AB addresses), Single addresses (max. 31 Single addresses/ASi network), ASi-5 address (max. 62 ASi-5 addresses/ASi network), mixed use allowed.
Upon request, ASi-3 nodes are available with specific ASi no-de profiles.
For modules with two ASi-3 nodes the 2nd ASi-3 node is turned off as long as the 1st ASi-3 node is addressed to address "0".

Article No.		BWU4042
General data		
Device type		counter input
Connection		
ASi connection		profile cable and piercing
Periphery connection		M12
Length of connector cable		I/O: 20 m (1)
ASi		
Address		1 ASi-5 address
Required master profile		M5
Since ASi specification		5
ASi process data width		8 byte (2)
Operating voltage		30 V (18 … 31.6 V)
Max. current consumption		245 mA
Max. current consumption without sensor/ actuator supply		45 mA
Input		
Number		depending on configuration: 4 x 1-channel 4 x 2-channel
Counting rate		max. 250 kHz
Range of value		impulse: -2147483647 ... 2147483647 dec. (start value configurable) (3)
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 (4)
	at +55 °C	140 mA (4)
	at +70 °C	120 mA (4)
Impulse counter and Encoder (24 V)		The required input signal level is < 5V for a low-signal and > 15V for a high signal.
Display		
LED ASi (green)		on: ASi voltage on flashing: ASi voltage on, but peripheral fault (5) or address 0 off: no ASi voltage
LED FAULT (red)		on: ASi address 0 or ASi participant offline flashing: peripheral fault (5) off: ASi participant online
LED C1A ... CnA (yellow)		**1-channel mode** on: signal at pulse counter input 1 ... 4 (Pin4) off: no signal
		2-channel mode with 4-times evaluation on: rising/falling edge at channel A of counter input 1 ... 4 (Pin2)
		2-channel mode without 4-times evaluation on: period recognized
LED C1B ... CnB (yellow)		**1-channel mode** on: status input 1 ... 4 (Pin2) active if bit USE CHx = 1 (5) off: status input 1 ... 4 (Pin2) not active if bit USE CHx = 1 (5) or bit USE CHx = 0
		2-channel mode with 4-times evaluation on: rising/falling edge at channel B of counter input 1 ... 4 (Pin2)
		2-channel mode without 4-times evaluation no function

Article No.	BWU4042
Environment	
Applied standards	EN 61000-6-2 EN 61000-6-3 EN 61131-2 EN 60529
It can be used with a switched AUX cable, which is passively safe up to SIL3/PLe	yes (6)
Operating altitude	max. 2000 m
Ambient temperature	-30 °C … +55 °C (up to max. +70 °C) (4) (7)
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	30*g*, 11 ms, acc. EN 61131-2
Max. tolerable vibration stress	5 ... 8 Hz 50 mm_{pp}/8 ... 500 Hz 6*g*, acc. EN 61131-2
Insulation voltage	≥ 500 V
Weight	200 g
Dimensions (W / H / D) in mm	45 / 80 / 38 (without substructure)

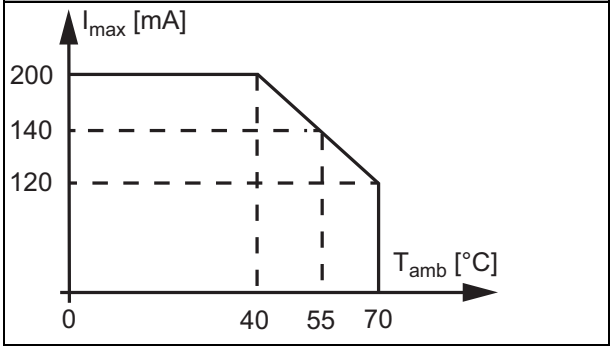
(1) Loop resistance ≤150 Ω

(2) The ASi-5 process data bandwidth depends on the ASi-5 profile. Further selectable profiles can be found in the hardware catalog of the Bihl+Wiedemann Suite or in the configuration manual.

(3) From Ident. No. ≥18955, for Ident. No. <18955 range of values -32768 ... 32767 dec.

(4)

BWU4042
Derating power supply of attached sensors

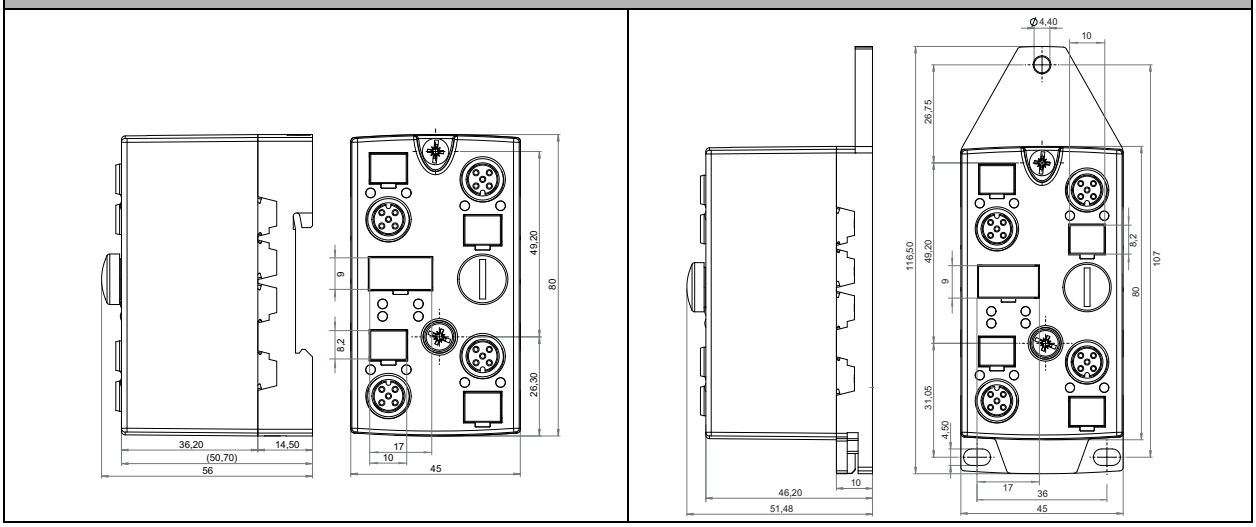


(5) **See table "Peripheral fault indication"**

(6) The module is suitable for use in passively safe paths as it has no connection to an AUX potential.

(7) 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 ≤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) standard profile - factory default 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 (1)	RO Ch1	USE Ch1	4TE Ch1	2C Ch1	CW Ch1	SV Ch1	Start/stop Ch1
	1	Prescaler Index Ch1 (integer) (2)							
	2	reserved (1)	RO Ch2	USE Ch2	4TE Ch2	2C Ch2	CW Ch2	SV Ch2	Start/stop Ch2
	3	Prescaler Index Ch2 (integer) (2)							
	4	reserved (1)	RO Ch3	USE Ch3	4TE Ch3	2C Ch3	CW Ch3	SV Ch3	Start/stop Ch3
	5	Prescaler Index Ch3 (integer) (2)							
	6	reserved (1)	RO Ch4	USE Ch4	4TE Ch4	2C Ch4	CW Ch4	SV Ch4	Start/stop Ch4
	7	Prescaler Index Ch4 (integer) (2)							

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

(2) see table “Prescaler Index”

Name	Explanation	
RO Chx	**Rollover:** 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	**use Pin2 channel x** 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	**4-times evaluation:** 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	**counter mode channel x** 0 = 1-channel input counter (pulse counter) 1 = 2-channel input counter (encoder)	
CW Chx	**direction of rotation channel x**	
	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: CxB before CxA = counting downwards
SV Chx	**start value channel x** 0 = start value 0 (default = 0) 1 = start value 1 (default = -2147483647) The stored start value for the SV Chx command can be adjusted via the prescaler index. (1)	
Start/stop Chx	**Start/stop channel x** Start/stop changes from 0 to 1: counter starts with start value 0 resp. start value 1 Start/stop changes from 1 to 0: counter stops and keeps last value	

(1)

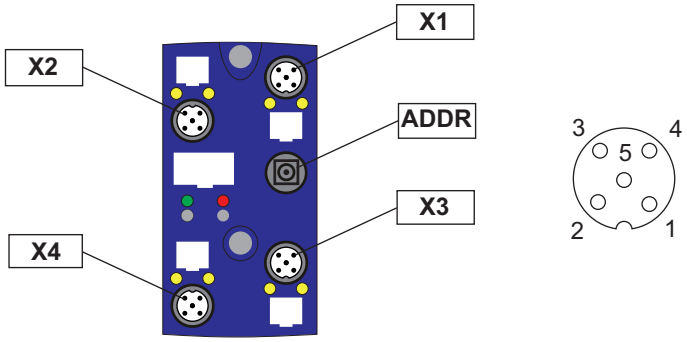
Article no.	Prescaler Index											
BWU4042	Index (dec)	255	...	8	7	6	5	4	3	2	1	0
	Prescaler value	reserved			128	64	32	16	8	4	2	1

Notice
For information on the process and parameter data of the extended profile (available from Ident. No. =18955), please refer to the configuration manual of the counter modules.

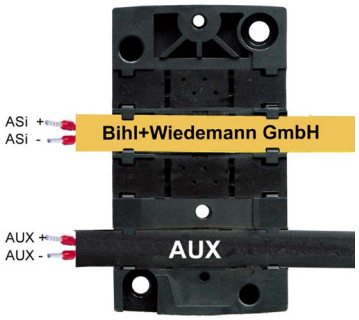
Pin assignment

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)
$24V_{out\ of\ ASi}$	power supply, out of ASi, positive pole (sensor supply)
$0V_{out\ of\ ASi}$	power supply, out of ASi, negative pole (sensor supply)
Shield	shield

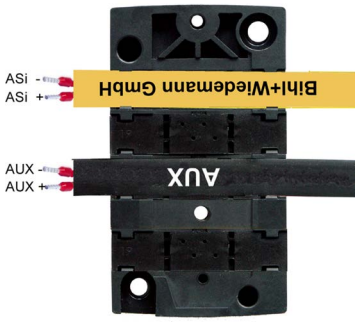
Connections							
Article no.	**M12 connection**	**Marking**	**Pin1**	**Pin2**	**Pin3**	**Pin4**	**Pin5**
BWU4042	**Configuration as: 4 x 2-channel input**						
	X1	C1A/C1B	24 $V_{out\ of\ ASi}$	C1 Channel B	0 $V_{out\ of\ ASi}$	C1 Channel A	n.c.
	X2	C2A/C2B	24 $V_{out\ of\ ASi}$	C2 Channel B	0 $V_{out\ of\ ASi}$	C2 Channel A	n.c.
	X3	C3A/C3B	24 $V_{out\ of\ ASi}$	C3 Channel B	0 $V_{out\ of\ ASi}$	C3 Channel A	n.c.
	X4	C4A/C4B	24 $V_{out\ of\ ASi}$	C4 Channel B	0 $V_{out\ of\ ASi}$	C4 Channel A	n.c.
	ADDR (protection cap)	connection for ASi-5 addressing plug					
	Configuration as: 4 x 1-channel input						
	X1	C1A/C1B	24 $V_{out\ of\ ASi}$	Status 1	0 $V_{out\ of\ ASi}$	Pulse 1 +	n.c.
	X2	C2A/C2B	24 $V_{out\ of\ ASi}$	Status 2	0 $V_{out\ of\ ASi}$	Pulse 2 +	n.c.
	X3	C3A/C3B	24 $V_{out\ of\ ASi}$	Status 3	0 $V_{out\ of\ ASi}$	Pulse 3 +	n.c.
	X4	C4A/C4B	24 $V_{out\ of\ ASi}$	Status 4	0 $V_{out\ of\ ASi}$	Pulse 4 +	n.c.
	ADDR (protection cap)	connection for ASi-5 addressing plug					



Mounting according to cable direction

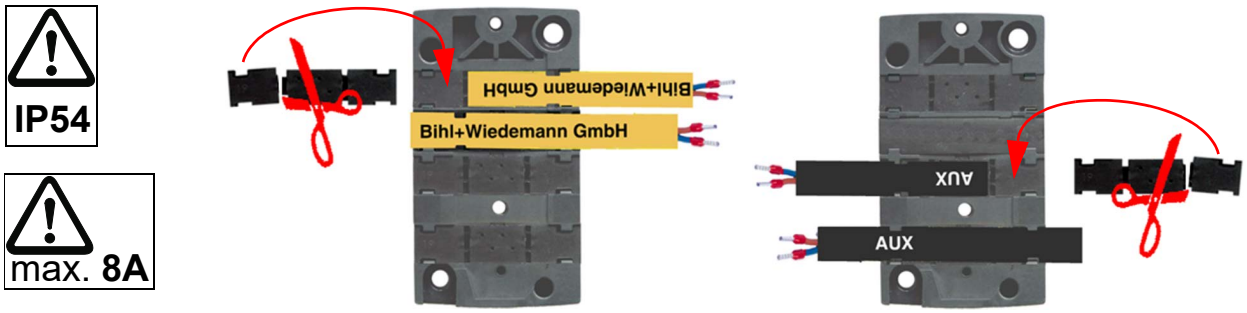


ordinary



turned

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)**
- **Universal protection cap ASi-5/ASi-3 for M12 sockets, IP67 (art. no. BW4056)**
- **Sealing profile IP67 (IDC plug), 45 mm (art. no. BW3283)**
- **ASi-5/ASi-3 Address Programming Device (art. no. BW4925)**