

# ASi-5 Counter Module, IP20, 22,5 mm

## ASi-5 – Great data bandwidth, short cycle times

4 x counter inputs, individually configurable and parameterizable via ASIMON360 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)

Protection category IP20



(figure similar)



| Figure                                                                              | Type                                       | Housing      | Inputs digital     | Range of values <sup>(1)</sup>          | Counting rate | Input voltage (sensor supply) <sup>(2)</sup> | ASi connection <sup>(3)</sup> | ASi address <sup>(4)</sup> | Article no.    |
|-------------------------------------------------------------------------------------|--------------------------------------------|--------------|--------------------|-----------------------------------------|---------------|----------------------------------------------|-------------------------------|----------------------------|----------------|
|  | IP20, 22,5 mm x 114 mm, 6 x COMBICON ASi-5 | 6 x COMBICON | 4 x counter inputs | impulse: -2147483647... 2147483647 dec. | max. 250 kHz  | out of AUX                                   | clamps                        | 1 ASi-5 address            | <b>BWU3875</b> |

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

<sup>(2)</sup> **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.

<sup>(3)</sup> **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).

<sup>(4)</sup> **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 node 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.                                              | <b>BWU3875</b>                |
|----------------------------------------------------------|-------------------------------|
| <b>General data</b>                                      |                               |
| Device type                                              | counter input                 |
| <b>Connection</b>                                        |                               |
| ASi/AUX connection                                       | Push-in terminals             |
| Periphery connection                                     | Push-in terminals             |
| Primary application                                      | decentralized control cabinet |
| Length of connector cable                                | I/O: 20 m <sup>(1)</sup>      |
| <b>ASi</b>                                               |                               |
| Address                                                  | 1 ASi-5 address               |
| Required Master profile                                  | M5                            |
| As of ASi specification                                  | 5                             |
| ASi process data width                                   | 8 byte <sup>(2)</sup>         |
| Operating voltage                                        | 30 V (18 ... 31,6 V)          |
| Max. current consumption                                 | 60 mA                         |
| Max. current consumption without sensor/ actuator supply | 60 mA                         |

|                                   |              |                                                                                                                                                                                                                                 |
|-----------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Article no.</b>                |              | <b>BWU3875</b>                                                                                                                                                                                                                  |
| <b>AUX</b>                        |              |                                                                                                                                                                                                                                 |
| Operating voltage                 |              | 24 V (18 ... 30 V)                                                                                                                                                                                                              |
| Max. current consumption          |              | 1 A                                                                                                                                                                                                                             |
| <b>Input</b>                      |              |                                                                                                                                                                                                                                 |
| Number                            |              | depending on configuration in ASIMON360:<br>• 4 x 1-channel<br>• 4 x 2-channel                                                                                                                                                  |
| Range of values                   |              | -2147483647 ... 2147483647 dec. (start value: -2147483647) <sup>(3)</sup>                                                                                                                                                       |
| Counting rate                     |              | max. 250 kHz                                                                                                                                                                                                                    |
| Power supply                      |              | out of AUX                                                                                                                                                                                                                      |
| Sensor supply                     |              | short-circuit and overload protected according to EN 61131-2                                                                                                                                                                    |
| Power supply of attached sensors  | up to +40 °C | 1 A <sup>(4)</sup>                                                                                                                                                                                                              |
|                                   | at +55 °C    | 0,7 A <sup>(4)</sup>                                                                                                                                                                                                            |
|                                   | at +70 °C    | 0,5 A <sup>(4)</sup>                                                                                                                                                                                                            |
| Switching threshold               |              | U<5 V (low)<br>U>15 V (high)                                                                                                                                                                                                    |
| Impulse Counter and Encoder (24V) |              | The required input signal level is < 5V for a low-signal and > 15V for a high signal.                                                                                                                                           |
| <b>Display</b>                    |              |                                                                                                                                                                                                                                 |
| LED ASi (green)                   |              | on: ASi voltage on<br>flashing: ASi voltage on, but peripheral fault <sup>(5)</sup> or address 0<br>off: no ASi voltage                                                                                                         |
| LED FAULT (red)                   |              | on: ASi address 0 or ASi participant offline<br>flashing: peripheral fault <sup>(5)</sup><br>off: ASi participant online                                                                                                        |
| LED AUX (green)                   |              | on: 24 VDC AUX<br>off: no 24 VDC AUX                                                                                                                                                                                            |
| LED C1A ... CnA (yellow)          |              | <b>1-channel mode</b><br>on: signal at pulse counter input 1 ... 4 (clamp C1A ... C4A)<br>off: no signal                                                                                                                        |
|                                   |              | <b>2-channel mode with 4-times evaluation</b><br>on: rising/falling edge at channel A of counter input 1 ... 4 (clamp C1A ... C4A)                                                                                              |
|                                   |              | <b>2-channel mode without 4-times evaluation</b><br>on: period recognized                                                                                                                                                       |
| LED C1B ... CnB (yellow)          |              | <b>1-channel mode</b><br>on: status input 1 ... 4 (clamp C1B ... C4B) active if bit USE CHx = 1 <sup>(5)</sup><br>off: status input 1 ... 4 (clamp C1B ... C4B) not active if bit USE CHx = 1 <sup>(5)</sup> or bit USE CHx = 0 |
|                                   |              | <b>2-channel mode with 4-times evaluation</b><br>on: rising/falling edge at channel B of counter input 1 ... 4 (clamp C1B ... C4B)                                                                                              |
|                                   |              | <b>2-channel mode without 4-times evaluation</b><br>no function                                                                                                                                                                 |

| Article no.                                                                      | BWU3875                                                                                             |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Environment</b>                                                               |                                                                                                     |
| Applied standards                                                                | EN 61000-6-2<br>EN 61000-6-3<br>EN 61131<br>EN 60529                                                |
| It can be used with a switched AUX cable, which is passively safe up to SIL3/PLe | yes <sup>(6)</sup>                                                                                  |
| Operating altitude                                                               | max. 2000 m                                                                                         |
| Ambient temperature                                                              | -25 °C ... +55 °C<br>(up to max. +70 °C) <sup>(4)</sup> <sup>(7)</sup><br>no condensation permitted |
| Storage temperature                                                              | -25°C ... +85°C                                                                                     |
| Housing                                                                          | plastic, for DIN rail mounting                                                                      |
| Pollution degree                                                                 | 2                                                                                                   |
| Protection category                                                              | IP20                                                                                                |
| Tolerable loading referring to humidity                                          | according to EN 61131-2                                                                             |
| Insulation voltage                                                               | ≥500 V                                                                                              |
| Weight                                                                           | 120 g                                                                                               |
| Dimensions (W / H / D) in mm                                                     | 22,5 / 99,6 / 114                                                                                   |

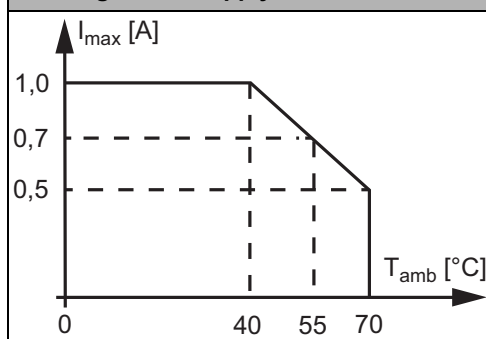
(1) Loop resistance ≤150 Ω

(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)

## BWU3875 Derating Power supply of attached sensors



(5) See table "Peripheral fault indication"

(6) The module is suitable for use in paths with a passively safe-switched AUX cable, since an exclusion of errors can be assumed for the connection of the two ASi and AUX potentials.

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

## Wiring rules

| Push-in terminals, 2 / 3 / 4 poles (pitch 5 mm)                    |                                                      |
|--------------------------------------------------------------------|------------------------------------------------------|
| <b>General</b>                                                     |                                                      |
| Nominal cross section                                              | 2.5 mm <sup>2</sup>                                  |
| <b>Conductor cross section</b>                                     |                                                      |
| Conductor cross section solid                                      | 0.2 ... 2.5 mm <sup>2</sup>                          |
| Conductor cross section flexible                                   | 0.2 ... 2.5 mm <sup>2</sup>                          |
| Conductor cross section flexible, with ferrule                     | without plastic sleeve: 0.25 ... 2.5 mm <sup>2</sup> |
|                                                                    | with plastic sleeve: 0.25 ... 2.5 mm <sup>2</sup>    |
| 2 conductors with same cross section, stranded, with TWIN ferrules | without plastic sleeve: 0.5 ... 1.5 mm <sup>2</sup>  |
| AWG                                                                | 24 ... 14                                            |
| Stripped insulation length                                         | 10 mm                                                |

| <b>UL-specifications (UL508)<br/>BWU3875</b> |                                                                                                                                                                                                     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.                                                                                         |

| Article no. | Peripheral fault indication                  |                       |                                                                                            |
|-------------|----------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
|             | counter overflow/underflow and<br>RO CHx = 0 | input short circuited | status input (clamp C1B ... C4B) in<br>1-channel mode is not active<br>but bit USE CHx = 1 |
| BWU3875     | •                                            | •                     | •                                                                                          |

## Programming (ASi Bit setting) standard profile - factory default setting

| Article no. | Byte | Bit                                |    |    |    |    |    |    |    |
|-------------|------|------------------------------------|----|----|----|----|----|----|----|
|             |      | D7                                 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|             |      | Input                              |    |    |    |    |    |    |    |
| BWU3875     | 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                                       |        |         |         |        |        |        |                |
| BWU3875     | 0    | reserved <sup>(1)</sup>                      | RO Ch1 | USE Ch1 | 4TE Ch1 | 2C Ch1 | CW Ch1 | SV Ch1 | Start/stop Ch1 |
|             | 1    | Prescaler Index Ch1 (decimal) <sup>(2)</sup> |        |         |         |        |        |        |                |
|             | 2    | reserved <sup>(1)</sup>                      | RO Ch2 | USE Ch2 | 4TE Ch2 | 2C Ch2 | CW Ch2 | SV Ch2 | Start/stop Ch2 |
|             | 3    | Prescaler Index Ch2 (decimal) <sup>(2)</sup> |        |         |         |        |        |        |                |
|             | 4    | reserved <sup>(1)</sup>                      | RO Ch3 | USE Ch3 | 4TE Ch3 | 2C Ch3 | CW Ch3 | SV Ch3 | Start/stop Ch3 |
|             | 5    | Prescaler Index Ch3 (decimal) <sup>(2)</sup> |        |         |         |        |        |        |                |
|             | 6    | reserved <sup>(1)</sup>                      | RO Ch4 | USE Ch4 | 4TE Ch4 | 2C Ch4 | CW Ch4 | SV Ch4 | Start/stop Ch4 |
|             | 7    | Prescaler Index Ch4 (decimal) <sup>(2)</sup> |        |         |         |        |        |        |                |

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

<sup>(2)</sup> see table "Prescaler Index"

| Name           | Explanation                                                                                                                                                                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RO Chx         | <b>Rollover:</b><br>0 = Counter stops at highest/lowest value in case of overflow/underflow<br>1 = Counter counts with lowest/highest value in case of overflow/underflow                                                                                          |
| USE Chx        | <b>use CxB channel x</b><br>0 = in 1-channel mode (pulse counter) CxB is ignored<br>1 = in 1-channel mode (pulse counter) CxB is used as status input                                                                                                              |
| 4TE Chx        | <b>4-times evaluation:</b><br>0 = no 4-times evaluation<br>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><br>0 = 1-channel input counter (pulse counter)<br>1 = 2-channel input counter (encoder)                                                                                                                                              |
| CW Chx         | <b>direction of rotation channel x</b><br>1-channel input counter (bit 2C Chx = 0)<br>0 = counting upwards<br>1 = counting downwards<br>2-channel input counter (bit 2C Chx = 1)<br>0: CxB before CxA = counting upwards<br>1: CxB before CxA = counting downwards |
| SV Chx         | <b>start value channel x</b><br>0 = start value 0 (default = 0)<br>1 = start value 1 (default = -2147483647)<br>The stored start value for the SV Chx command can be adjusted via the prescaler index. <sup>(1)</sup>                                              |
| Start/stop Chx | <b>Start/stop channel x</b><br>Start/stop changes from 0 to 1: counter starts with start value 0 resp. start value 1<br>Start/stop changes from 1 to 0: counter stops and keeps last value                                                                         |

<sup>(1)</sup>

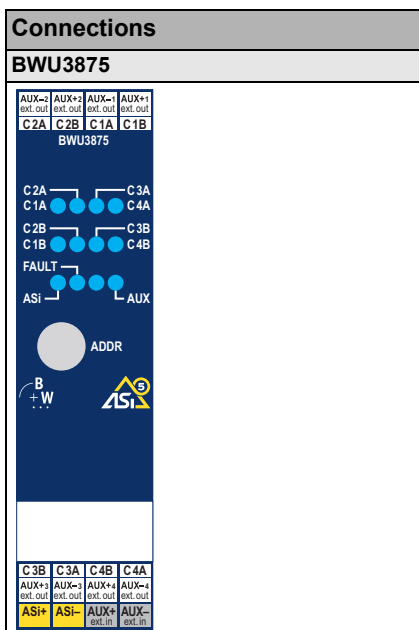
| Article no. | Prescaler Index |          |     |   |     |    |    |    |   |   |   |   |
|-------------|-----------------|----------|-----|---|-----|----|----|----|---|---|---|---|
| BWU3875     | Index (dec)     | 255      | ... | 8 | 7   | 6  | 5  | 4  | 3 | 2 | 1 | 0 |
|             | Prescaler 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.

## Connections

| Signal name                                           | Explanation                                                                                                                                          |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| CxA                                                   | <ul style="list-style-type: none"> <li>2-channel mode: input signal x channel A</li> <li>1-channel mode: pulse counter input x, high rise</li> </ul> |
| CxB                                                   | <ul style="list-style-type: none"> <li>2-channel mode: input signal x channel B</li> <li>1-channel mode: status input x</li> </ul>                   |
| AUX+ <sub>x ext.out</sub> , AUX- <sub>x ext.out</sub> | power supply, out of external voltage (AUX, sensor supply)                                                                                           |
| ASi+, ASi-                                            | connection to ASi bus                                                                                                                                |
| AUX + <sub>ext.in</sub>                               | power supply, out of external voltage, positive pole (AUX)                                                                                           |
| AUX - <sub>ext.in</sub>                               | power supply, out of external voltage, negative pole (AUX)                                                                                           |
| ADDR                                                  | connection for ASi addressing device                                                                                                                 |
| n.c. (not connected)                                  | not connected                                                                                                                                        |



### Note

To achieve passive safety, the device must be installed in a switching cabinet with protection class IP54.

## Accessories:

- Bihl+Wiedemann Suite, Set consisting of ASi Control Tools360 and diagnostics software (Article no. BW2902)
- ASi-5/ASi-3 Address Programming Device (art. no. BW4925)