



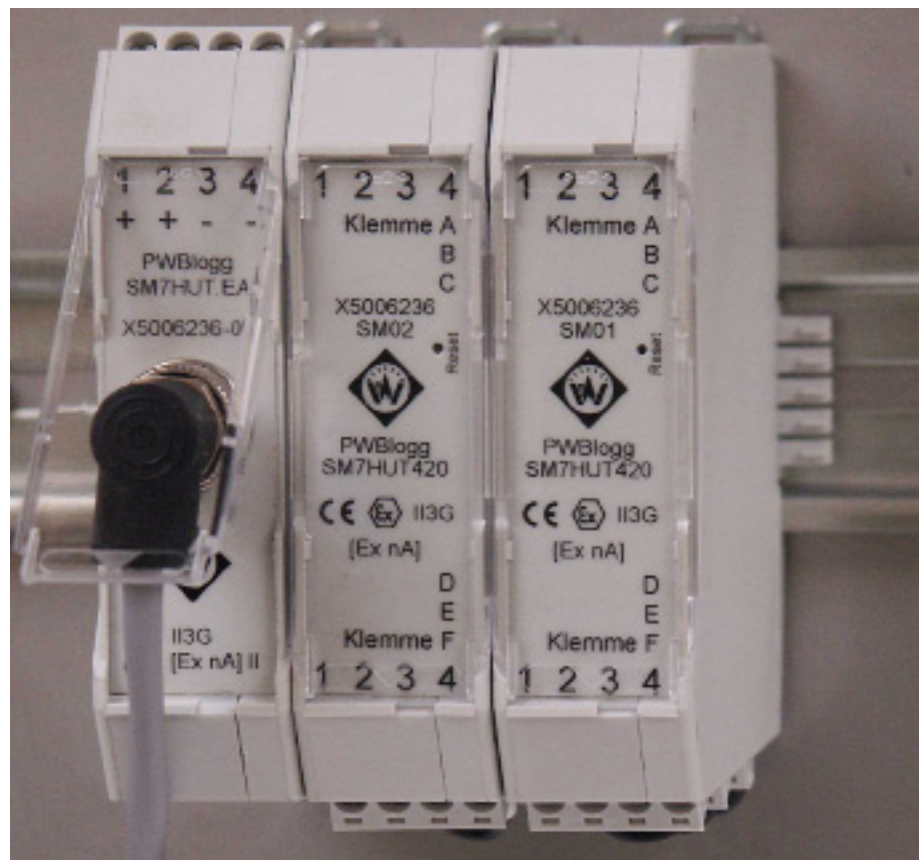
**PAULWEGENER**  
MESSTECHNIK SEIT 1921

## Operating manual

Data acquisition system

# PWBlogg

SM7HUT



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Design and specifications are subject to change without notice.

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# 1 Safety instructions

## 1.1 General safety instructions

The device series PWBlogg SM7 includes one supply module (SM7HUT.EA) and several function modules (SM7HUT...). The function modules are supplied with energy and data signals via bus connector.

The voltage is supplied by primary lithium cells in the data logger. But some functions may need an external mains adapter.

The supply module facilitates connecting data logger and function modules. External mains adapters (pluggable power supply units, top head rails etc.) can also be connected here. Hence, an external voltage supply can also be used to supply the data logger.

- Use **no** other mains adapters, batteries and battery packs than the ones delivered or recommended by manufacturer. Otherwise, the device can become severely damaged and accidents can happen.
- To get further hints on handling batteries and battery packs, please read the safety instructions of your data logger's manual.
- Avoid mechanical damage of the mains adapter's power cable, since these can cause fire or electric shocks. Do not use damages connecting cables any more.



**Attention: The electronics consists of electrostatic sensitive components. Pay attention to the ESD-operation instructions when handling with this electronics!**

## 1.2 Safety instructions for use within ex-zone 2

The sensor modules of the SM7 series are in accordance with the directive 94/9EG (ATEX) as operational supplements falling in category II(3)G deliverable and are strictly installed and operated within the safe area. Using them within gas-explosive hazardous areas is not permitted!

The function module SM7HUT.420 is destined for connecting up to three transducers which comply with the ignition protection type „Ex nA“.

The function module SM7HUT.DIG has three intrinsically inputs with protection level „ic“ to record digital counter and status signals.

The supply module SM7HUT.EA ensures safe connection between a data logger PWBlogg and the function modules. In this case it is permitted that the data logger is installed and operated in the ex-zone 2, provided that it is a type with ignition protection level „Ex nA“.

Please note the following safety instructions:

- Only pre-assembled inputs/outputs must be used. Subsequent installations are not permitted.
- The external voltage supply of the sensor modules is strictly done by using the supply module (SM7HUT.EA). The supply module is designed for an input voltage of 12VDC, the performance of the line adapter depends on the number of connected function modules. Use the line adapter at the provided line voltage.
- In case of damaged cables (data, transducer or ac power line), the device must not further be operated. Please ask manufacturer for purpose of a repair.
- Any subsequent modification to the device result in the consequence that secure use within ex-zone 2 is no more guaranteed and the EC-declaration of conformity loses its validity.

Before mounting the device in the hazard area, check whether the ambient conditions comply with the safety level of the data logger (ambient temperatures, gas group, temperature class etc.). The valid mounting and operating regulations must be followed as appropriate.

## 2 Mounting

### 2.1 General mounting instructions

The modules PWBlogg SM7 series are designed to be mounted on standard 35 mm carriers and top hat rails respectively. Connecting individual modules is done by bus connectors. To avoid damage at carrier rail or plastic parts, never apply excessive force. All items are compatibly produced and, hence, can be mounted without expenditure of energy.

### 2.2 Mounting the bus connector

To mount the bus connectors, initially connect the individual bus connectors with each other. Thereafter, arrange the one-piece lugs into the carrier rail from below. Slight pressure on the top (forked) lugs facilitates firmly connecting the bus connector to the carrier rail. The bus connectors click into place. Figure 1 shows the bus connectors mounted on the carrier rail.

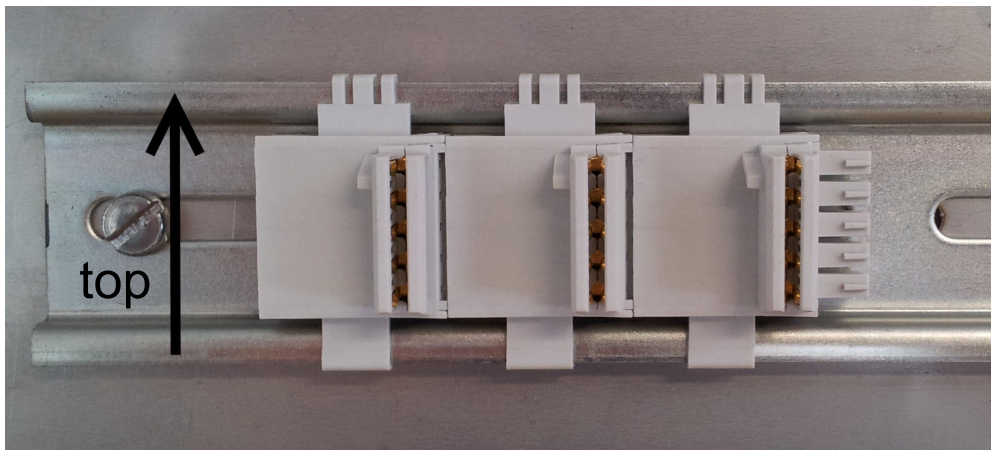


Figure 1: carrier rail with bus connectors

### 2.3 Mounting the modules

The PWBlogg SM7 modules have a carrier rail fitting system on their back. The silver slide lock is on its top end. When looking at the front of the device, the inscription should be correctly readable.

To be able to fit the modules on the carrier rail, move the module straightly onto the bus connector first. Thereafter move the module downwards and push the lower lug under the carrier rail (see figure 2). Finally, turn the module upwards till the slide lock audibly clicks into place. Figure 3 shows a mounted module.

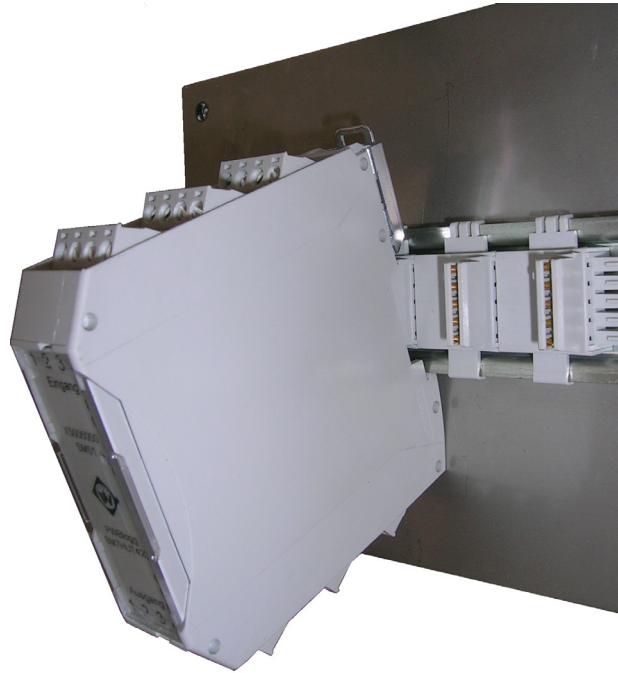


Figure 2: module being mounted

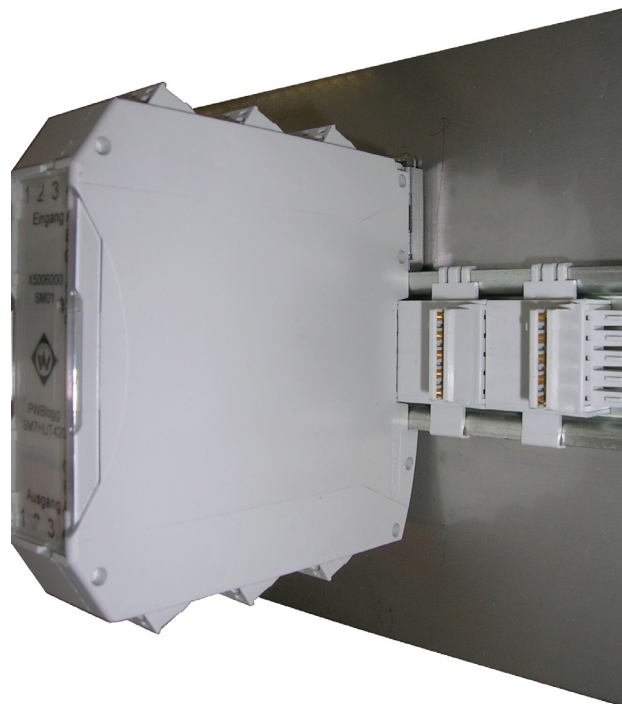


Figure 3: mounted module

To disassemble, please pull the metal lug of the slide lock upwards and turn the module downwards. Now, you can release the slide lock again and remove the module from the carrier rail.

### 3 Connection to data logger

The supply module SM7HUT.EA is used to connect the data logger to the SM7 modules. Using the delivered connecting cable fitted and screwed at the front side, this supply module establishes connection between data logger and any other module connected over the bus connector.

## 4 Operation instruction

### 4.1 Module reset

An inadmissible state can rarely happen, which leads to a module crash. The communication between data logger and module can be interrupted in such case.

The data logger's display shows an asterisk after the channel number (at inputs). Despite change at the input, the output may not register a respective change.

The small hole in the front panel labelled with *Reset* facilitates setting the module to its initial state. An open-bended paper clip or a similar thin item (approx. 1 mm diameter) should do. Please insert the paper clip carefully through the hole and press it till you feel the tactile switch operates. When releasing the tactile switch (removing the paper clip), the module's controller will restart and, hence, the module should operate normally again.

If this procedure does not solve the described problems, please check again whether all signal lines are in a correct state or whether they should be replaced as the case may be.

### 4.2 LED display

An LED is behind the front panel of the modules for status control. After measurement has been activated, it will flash in time with measurement (battery-driven modules only). Using mains-supplied devices, the LED illuminates permanently.

## 5 Signal circuits

### 5.1 General notes

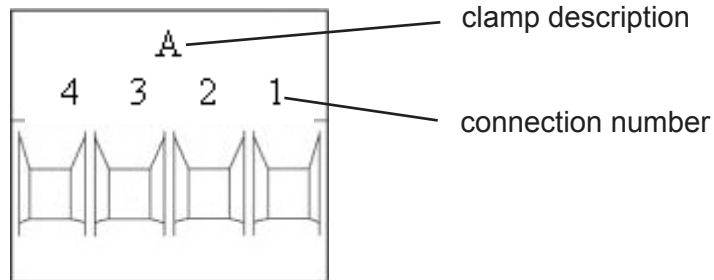


Figure 4: terminal block

Figure 4 shows the top view of a terminal block and allocation of individual ports for the connecting clamp A.

## 5.2 SM7HUT.420

### 5.2.1 Analogue inputs

The sensor module SM7HUT.420 has up to three analogue inputs. The inputs are specified for an input range from 0,5...4,5 V by default. Further measurement ranges (0..10V, 4..20mA, etc.) are available on request.

Analogue signals are connected at clamps A, B and C. Clamp C is the closest one to the front side. Transducer wiring is done as follows:

| connection number | name | description                 |
|-------------------|------|-----------------------------|
| 1                 | GND  | ground                      |
| 2                 | SIG  | transducer signal           |
| 3                 | +5V  | 5V transducer supply        |
| 4                 | +12V | 6,5...12V transducer supply |

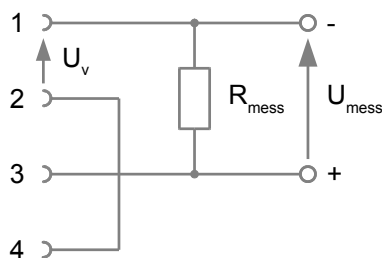
### 5.2.2 4-20mA output

The 4-20mA output signals are connected at the clamps D, E and F. Clamp F is the closest one to the front side. The clamps are occupied as follows:

| connection number | name    | description                                |
|-------------------|---------|--|
| 1                 | signal- | negative contact of control path           |
| 2                 | signal+ | positive contact of control path           |
| 3                 | 12V-    | ground of insulated power supply           |
| 4                 | 12V+    | positive voltage of insulated power supply |

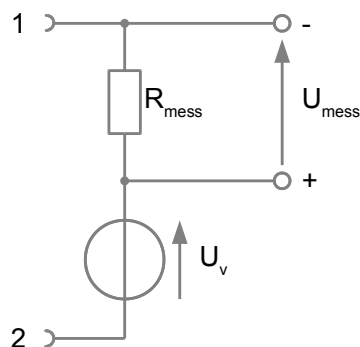
#### 5.2.2.1 Passive standard signal pickup

connection number



#### 5.2.2.2 Active standard signal pickup

connection number





### 5.2.3 Connection parameters

All connection options' maximum apparent ohmic resistance (referred to as  $R_{mess}$ ) have following formula:

$$R_{mess} = \frac{(U_v - 7,5 V)}{0,02 A} \quad (\text{equation 1})$$

The value of passive standard signal pickups results to a maximum of 225  $\Omega$ . If larger sensor resistors are used, the whole output area of 4 till 20mA can not be used.

As far as standard signal pickups are concerned, the impressed voltage between signal+ and signal- must not be higher than 30V ( $UV \leq 30V$ ).

## 5.3 SM7HUT.DIG

### 5.3.1 Digital inputs

The sensor module SM7HUT.DIG has up to three digital inputs. There is the choice between sensors with dry contact (PK), open collector (OC), voltage pulse (SP) or Namur output (NA). Due to increased power consumption of the circuit on Namur, the Namur transducers are only used related to factory-configured transducer modules.

Digital input signals are connected at clamps A, B and C. Clamp C is the closest one to the front side. Transducer wiring is done as follows:

| connection number | name  | description                               |
|-------------------|-------|---|
| 1                 | GND   | ground (-)                                |
| 2                 | PK/OC | potential-free contact/open collector (+) |
| 3                 | SP    | voltage pulse (+)                         |
| 4                 | NA    | Namur (+)                                 |

If e.g. a counter with reed contact (potential-free) or open collector is supposed to be connected, the cables with contact 1 and 2 must be connected. A sensor with voltage pulse output must be connected with contact 1 and 3 and sensors with Namur output with 1 and 4. When using open collector, voltage pulse and Namur, take care of correct polarity of the connecting cables.

Using PK or OC sensors at Namur contact is technically possible indeed, but it cannot be recommended due to increased power consumption.

### 5.3.2 Digital outputs

The sensor module SM7HUT has up to 3 digital outputs. Each channel can configure itself to direct forwarding the opposing input signal or to alarm value indication by a data logger.

The digital outputs are connected at the clamps D, E and F. Clamp F is the closest one to the front side. The clamps are occupied as follows:

| connection number | name | description               |
|-------------------|------|---------------------------|
| 1                 | GND  | ground (-)                |
| 2                 | OC   | open collector output (+) |
| 3                 | PK   | relay contact             |
| 4                 | PK   | relay contact             |

Each channel has two arbitrary outputs, but the relay contact output operates only if external supply is available. On the contrary, the open collector output operates even if there is optional battery supply without external supply.

### 5.3.3 Contact parameters

#### 5.3.3.1 Digital inputs

##### 1. Potential-free contact / open collector

|                         |               |
|-------------------------|---------------|
| Nominal voltage:        | 3,3V          |
| Maximum output voltage: | 12V $\pm$ 10% |
| Maximum output current: | 20mA          |

##### 2. Voltage pulse

|               |        |
|---------------|--------|
| Pulse voltage | 3..30V |
|---------------|--------|

##### 3. Namur

|                         |                        |
|-------------------------|------------------------|
| Nominal voltage:        | 8,2V $\pm$ 0,1V        |
| Maximum output voltage: | 9,2V                   |
| Internal resistance:    | 1000 $\Omega$ $\pm$ 1% |
| Current not recognized: | >1,75mA                |
| Current recognized:     | <1,55mA                |

#### 5.3.3.2 Digital outputs

##### 1. Relay contact

|                            |            |
|----------------------------|------------|
| Maximum contact voltage:   | 250V AC/DC |
| Maximum switching current: | 2A         |
| Maximum switching power:   | 60W        |

##### 2. Open collector

|                            |       |
|----------------------------|-------|
| Maximum collector voltage: | 45V   |
| Maximum collector current: | 100mA |

## EG-DECLARATION OF CONFORMITY

Herewith we declare that the data acquisition systems of type range

### PWBlogg SM7

complies with the directive **2004/108/EG** in reference to electromagnetic compatibility and **94/9/EG** for use according to regulations in consideration of explosion-hazard areas. The data acquisition system was developed according to following harmonizing of standards:

- EN 61000-6-3** subject basic standard for emitted interference – emitted interference for living quarters, business- and trade as well as small firms
- EN 61000-6-1** subject basic standard for interference resistance – emitted interference for living quarters, business- and trade as well as small firms
- EN 60079-0** electrical equipment for explosion-hazard areas, section 0: general requirements
- EN 60079-11** potentially explosive atmosphere - section 11: equipment protection by intrinsic safety „i“
- EN 60079-15** electrical equipment for explosion-hazard areas, section 15: construction, test and marking of electrical equipment of ignition protection type „n“

Marking for safe use in explosion-hazard areas:

**SM7HUT.EA**  
and **SM7HUT.420:**

 **II(3)G [Ex nA] II**  
-20 °C ≤ Ta ≤ +60 °C

**SM7HUT.DIG:**

 **II(3)G [Ex ic] IIB**  
-20 °C ≤ Ta ≤ +60 °C

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**The safety advice of the product documentation must be followed!**

Ballenstedt, 15.04.2013



Wegener  
Managing Director

## Technical specifications

### General:

|                    |             |
|--------------------|-------------|
| Supply voltage:    | 12VDC       |
| Power input:       | max. 0,15 A |
| Temperature range: | -20..+60°C  |

### SM7HUT.420:

|                                  |                                |
|----------------------------------|--------------------------------|
| Number of analogue inputs:       | max. 3                         |
| Pressure ranges:                 | 0..50mbar/1000bar              |
| Accuracy:                        | 1% FS (0,5%, 0,25% on request) |
| Explosion protection (optional): | II(3)G [Ex nA] II              |
| Number of 4..20mA outputs:       | max. 3                         |
| Ripple:                          | ± 10µA                         |

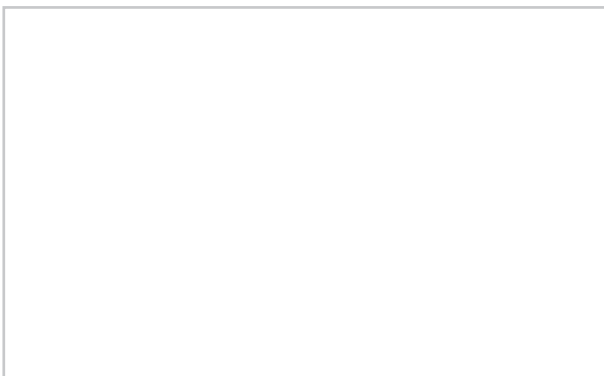
### SM7HUT.DIG:

|                                  |  |
|----------------------------------|--|
| Number of digital inputs:        | max. 3   |
| Type of digital inputs:          | potential-free contact<br>open collector<br>voltage pulse<br>Namur (IEC 60947-5-6) |
| Explosion protection (optional): | II(3)G [Ex ic] IIB   |
| Number of digital outputs:       | max. 3   |
| Type of digital outputs:         | relay contact<br>open collector  |









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