

# PS 101

## S-DIAS Power Supply Module

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## S-DIAS Power Supply Module

**PS 101****with 1 CAN****1 USB Host**

The S-DIAS PS 101 power supply module is a supply unit for a CPU component and the S-DIAS IO modules. The module also has a CAN and USB host interface, which only function when used with a CPU module such as the CP 111. Additionally, the module is equipped with an exchangeable lithium battery to power a real-time clock and zero-voltage proof RAM in the CPU module.



## Contents

<b>1</b>	<b>Technical Data .....</b>	<b>4</b>
1.1	Performance Data .....	4
1.2	Electrical Requirements .....	4
1.2.1	Module Supply (Input) .....	4
1.2.2	S-DIAS Bus Supply (Output) .....	5
1.3	Miscellaneous .....	7
1.4	Environmental Conditions .....	7
<b>2</b>	<b>Mechanical Dimensions .....</b>	<b>8</b>
<b>3</b>	<b>Connector Layout .....</b>	<b>9</b>
3.1	Status LEDs .....	9
3.2	Connector .....	10
3.3	Applicable Connectors .....	11
3.4	Label Field .....	12
<b>4</b>	<b>CAN Bus Setup .....</b>	<b>13</b>
4.1	CAN Bus Station Number .....	13
4.2	Number of CAN Bus Participants .....	13
4.3	CAN Bus Data Transfer Rate .....	13
4.4	CAN Bus Termination .....	14
<b>5</b>	<b>Buffer Battery .....</b>	<b>15</b>
<b>6</b>	<b>Wiring Guidelines .....</b>	<b>16</b>

**7 Mounting ..... 17**

## 1 Technical Data

### 1.1 Performance Data

Interfaces	1x USB host 2.0 (high speed 480 Mbit/s) 1x CAN
Status display	no
Status LEDs	yes

The CAN and USB interfaces only function when used with a CPU module such a CP 111.

### 1.2 Electrical Requirements

#### 1.2.1 Module Supply (Input)

Supply voltage	+18-30 V DC UL: Class 2 or LVLC <sup>(1)</sup>
Current consumption of voltage supply (+24 V)	maximum 2.75 A <sup>(2)</sup>

<sup>(1)</sup> Limited Voltage/Limited Current

<sup>(2)</sup> the current consumption is dependent on the connected loads

#### <sup>(1)</sup> For USA and Canada:

**The supply must be limited to:**

- a) max. 5 A at voltages from 0-20 V DC, or**
- b) 100 W at voltages from 20-60 V DC**

**The limiting component (e.g. transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory).**

#### <sup>(1)</sup> Pour les États-Unis et le Canada:

**L'alimentation doit être limitée à:**

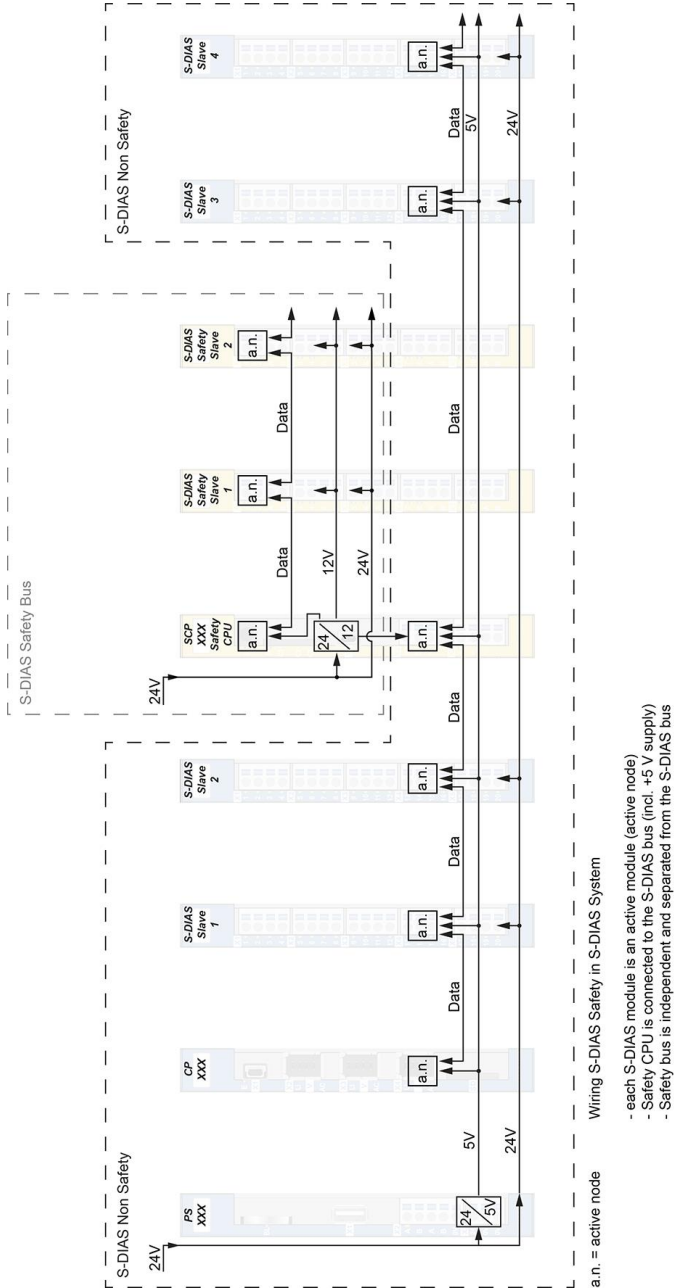
- a) max. 5 A pour des tensions de 0-20 V DC, ou**
- b) 100 W pour des tensions de 20-60 V DC**

**Le composant imposant la limite (par exemple, transformateur, alimentation électrique ou fusible) doit être certifié par un NRTL (National Recognized Testing Laboratory, par exemple, UL).**

### 1.2.2 S-DIAS Bus Supply (Output)

Voltage supply on the S-DIAS bus	+5 V
Current consumption on the S-DIAS bus (+5 V supply)	maximum 1.6 A <sup>(1)</sup>
Voltage supply on the S-DIAS bus	+24 V
Current consumption on the S-DIAS bus (+24 V supply)	maximum 1.6 A <sup>1</sup>

<sup>(1)</sup> the current consumption is dependent on the connected loads





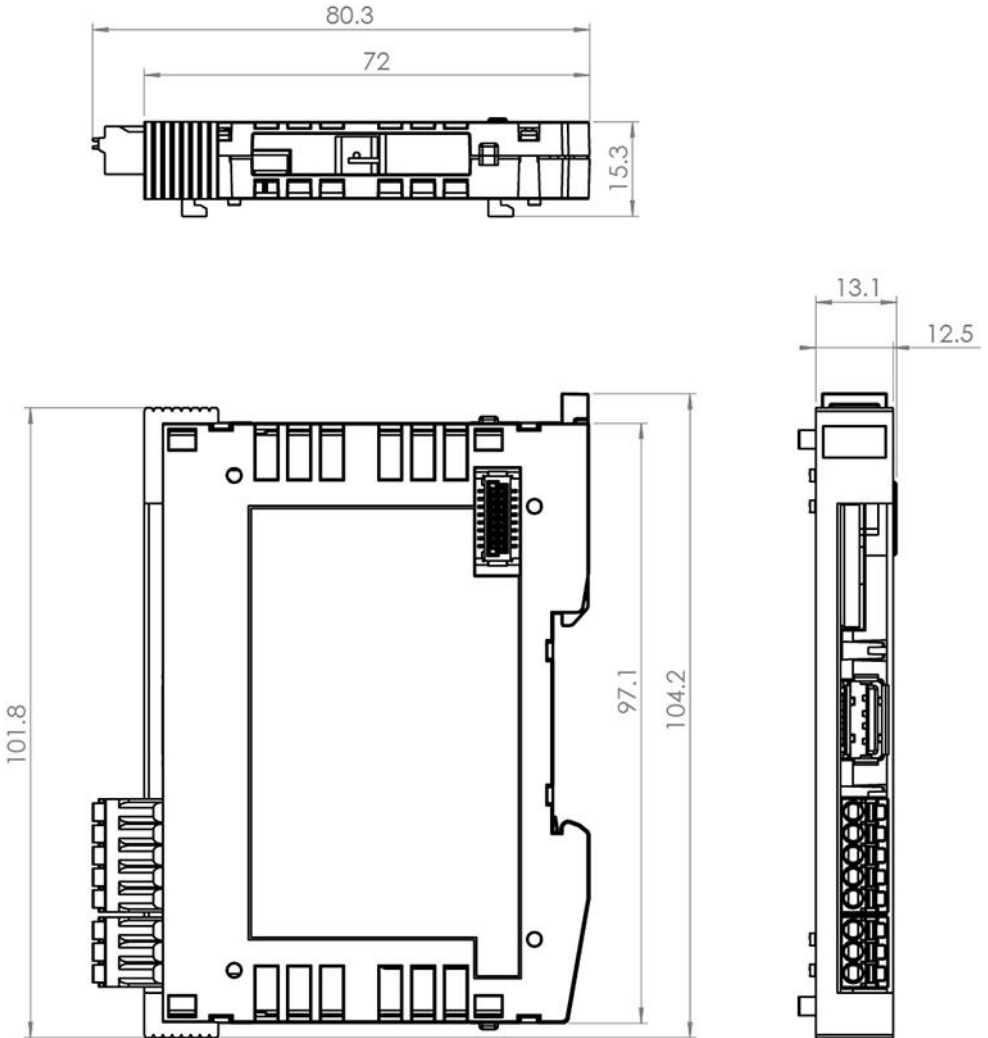
### 1.3 Miscellaneous

Article number	20-003-101
Hardware version	1.x
Standard	UL 508 (E247993)
Approbations	UL, cUL, CE

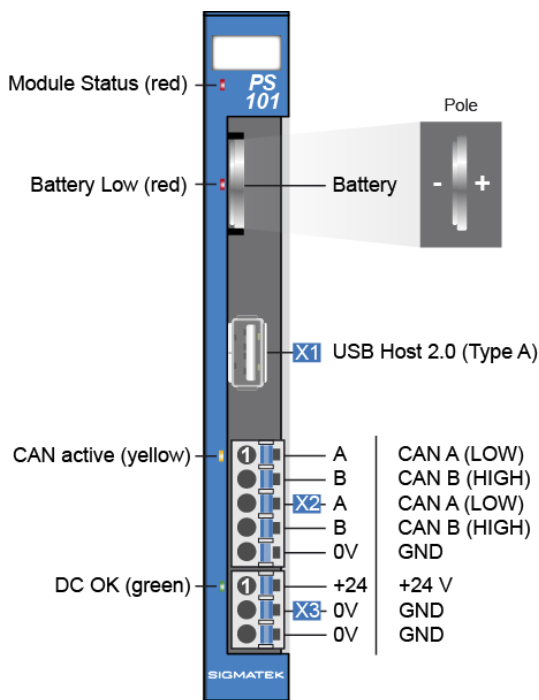
### 1.4 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C	
Humidity	0-95 %, non-condensing	
Operating conditions	Pollution degree 2 altitude up to 2000 m	
EMC resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

## 2 Mechanical Dimensions



### 3 Connector Layout



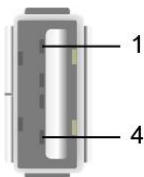
The GND supply (X4: Pin 2 and Pin 3) is internally bridged. Only one GND pin (pin 2 or pin 3) is required to power the module. The bridged connections may be used for further looping of the +24 V supply and the GND supply. However, it must be taken into account that a total current of 6 A per connection is not exceeded by the forward looping!

#### 3.1 Status LEDs

Module Status	red	ON	CPU is in RESET status
Battery Low	red	ON	battery is empty
CAN active	yellow	BLINKS	data is being exchanged
DC OK	green	ON	module is supplied with a voltage > 18 V

## 3.2 Connector

### X1: USB Host 2.0 (Type A)



Pin	Function
1	+5 V
2	D-
3	D+
4	GND

**It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended that every USB stick be tested before actual use.**

**Il faut souligner que la plupart des périphériques USB sur le marché ne sont pas conformes aux spécifications USB, ce qui peut entraîner des dysfonctionnements de l'appareil. Il est également possible que ces dispositifs ne seront pas détectés par le port USB ou qu'ils ne fonctionnent pas correctement. Par conséquent, il est recommandé que chaque clé USB soit testée avant l'utilisation sur l'automate.**

### 3.3 Applicable Connectors

**X1:** USB 2.0 Type A (not included in delivery)

**X2 and X3:** Connectors with spring terminals (included in delivery)

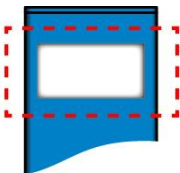
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

#### Connections:

Stripping length/Sleeve length:	10 mm
Plug-in direction:	parallel to conductor axis or to PCB
Conductor cross section, rigid:	0.2-1.5 mm <sup>2</sup>
Conductor cross section, flexible:	0.2-1.5 mm <sup>2</sup>
Conductor cross section, ultrasonically compacted:	0.2-1.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil:	24-16
Conductor cross section flexible, with ferrule without plastic sleeve:	0.25-1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve:	0.25-0.75 mm <sup>2</sup> (ground for reducing d2 of the ferrule)



### 3.4 Label Field



Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Weidmüller article number	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Weidmüller article number	1324380000

## 4 CAN Bus Setup

This section explains how to correctly configure the CAN bus. The following parameters must first be set: Station number and data transfer rate.

### 4.1 CAN Bus Station Number

Each CAN bus station is assigned its own station number. With this station number, data can be exchanged with other stations connected to the bus. In a CAN bus system however, each station number can only be assigned once!

### 4.2 Number of CAN Bus Participants

The maximum number of participants on the CAN bus depends on the cable length, termination resistance, data transfer rate and the drivers used in the participants.

With a termination resistance of 120  $\Omega$ , at least 100 participants are possible.

### 4.3 CAN Bus Data Transfer Rate

Various data transfer rates (baud rates) can be set on the CAN bus. The longer the bus line is, the lower the data transfer rate that must be selected.

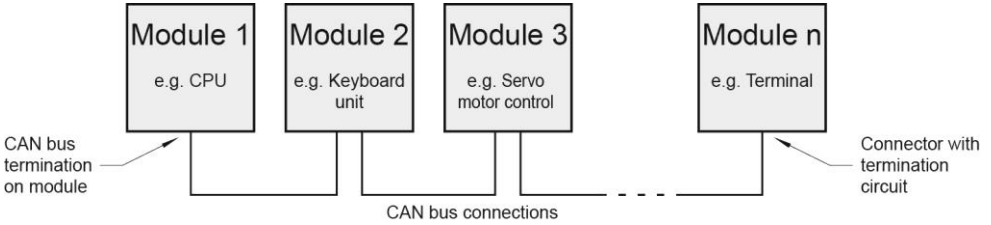
Value	Baud rate	Maximum length
00	615 Kbits/s	60 m
01	500 Kbit/s	80 m
02	250 Kbits/s	160 m
03	125 Kbits/s	320 m
04	100 Kbits/s	400 m
05	50 Kbits/s	800 m
06	20 Kbits/s	1200 m
07	1 Mbit/s	30 m

These values apply to the following cable: 120  $\Omega$  Twisted Pair.

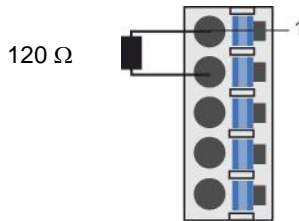
Note: For the CAN bus protocol: 1 Kbit/s = 1 kBaud.

## 4.4 CAN Bus Termination

In a CAN bus system, both end modules must be terminated. This is necessary to avoid transmission errors caused by reflections in the line.



If the PS 101 supply module with a processor module like the CP 111 is one of the end modules, it can be terminated by placing a  $120\ \Omega$  resistor between CAN A (LOW) and CAN B (HIGH).





## 5 Buffer Battery

The exchangeable buffer battery ensures that programs and data in the expanded memory (SRAM) as well as the clock time (RTC) of the CPU module (e.g. CP 111) are preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

The battery has enough capacity to preserve data in the absence of a supply voltage for up to 3 years.

We recommend however, that the battery be replaced annually to ensure optimal performance.

**Battery order number: 01-690-028**

	MANUFACTURER	DATA
Lithium battery	RENATA (CR2032)	3.0 V / 200 mAh

**Caution:**

The battery can only be exchanged when power is **supplied** to the module; otherwise data loss will occur!

**Attention:**

La pile ne peut être échangée que lorsque **la tension d'alimentation est présente** sur le module, sinon la perte de données survient!

A weak battery is first detected by the supervisor circuit on the CPU module and displayed by the control software. When the battery voltage continues to fall eventually the supervisor circuit on the PS 101 module triggers and the red LED "Battery Low" is illuminated. The battery must be replaced soon to avoid data loss in case of power failure.

When the battery voltage is in between the supervisor circuit thresholds, it may happen that the battery is detected "good" during operation, but "low" after a power cycle. If this happens, it is recommended to replace the battery.

## 6 Wiring Guidelines

The input filters, which suppress noise signals, allow operation in harsh environmental conditions. A careful wiring method is also recommended to ensure error-free function.

The following guidelines should be observed:

- Avoid parallel connections between input lines and load-bearing circuits.
- Protective circuits for all relays (RC networks or free-wheeling diodes)
- Correct wiring to ground

**The ground bus should be connected to the control cabinet when possible!**

**Si possible la terre doit être connectée à l'armoire de commande!**

**IMPORTANT:**

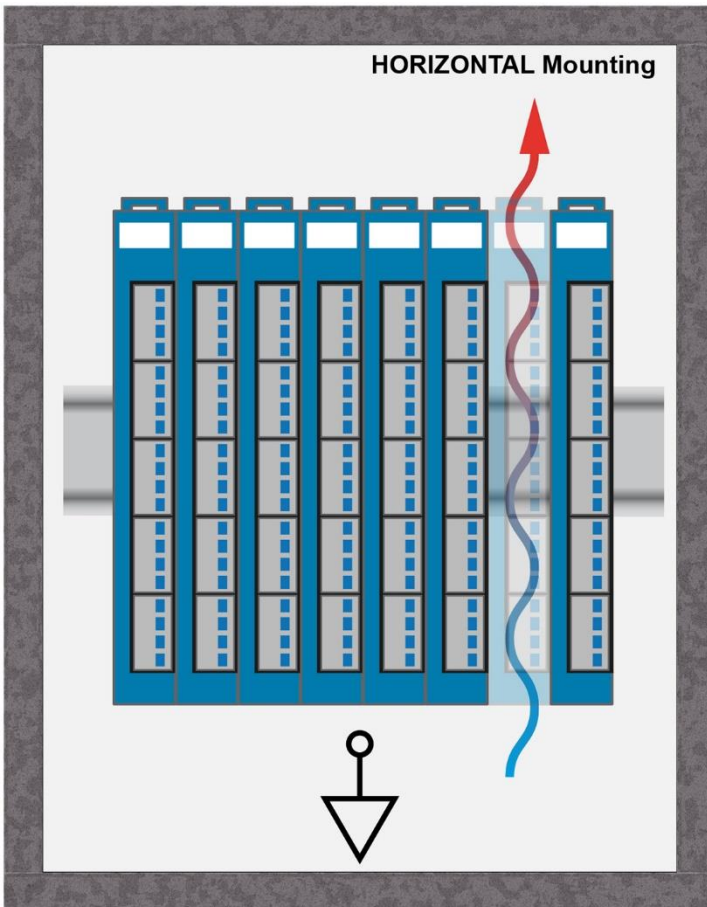
**The S-DIAS module CANNOT be connected or disconnected while voltage is applied!**

**IMPORTANT:**

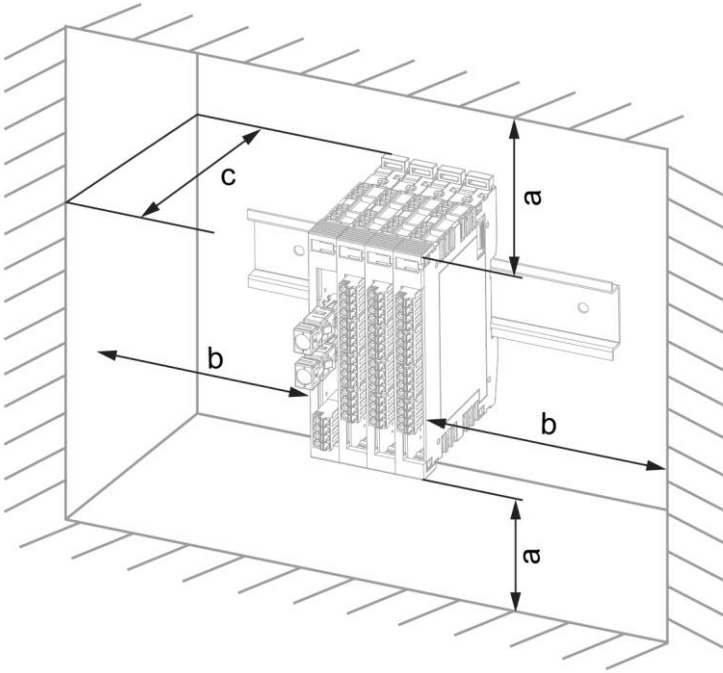
**Le module S-Dias NE PEUT PAS être inséré ou retiré sous tension.**

## 7 Mounting

The S-DIAS modules are designed for installation into the control cabinet. To mount the modules a DIN-rail is required. The DIN rail must establish a conductive connection with the back wall of the control cabinet. The individual S-DIAS modules are mounted on the DIN rail as a block and secured with latches. The functional ground connection from the module to the DIN rail is made via the grounding clamp on the back of the S-DIAS modules. The modules must be mounted horizontally (module label up) with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is necessary for optimal cooling and air circulation, so that proper function up to the maximum operating temperature is ensured.



Recommended minimum distances of the S-DIAS modules to the surrounding components or control cabinet wall:



<b>a</b>	<b>b</b>	<b>c</b>
<b>30 mm (1.18")</b>	<b>30 mm (1.18")</b>	<b>100 mm (3.94")</b>

a, b, c ... distances in mm (inches)

## Documentation Changes

Change date	Affected page(s)	Chapter	Note
11.02.2014	6	3 Connector Layout	Changed image
01.04.2014	8 12	4.3 Can Bus Termination 7 Mounting	150R to 120R changed Text updated
16.04.2014	8	4.1 CAN Bus Station number 4.2 CAN Bus Participants	Text updated Text updated
18.07.2014	6	3 Connector Layout	Added wiring notice
08.09.2014	3 4	1.2 Electrical Requirements 1.3 Miscellaneous	Added Supply voltage (UL) and notice in grey box Added Standard
30.01.2015	11	6 Wiring Guidelines	Added note concerning connecting the S-DIAS module while voltage is applied
11.03.2015	6	3 Connector Layout	Battery polarity added
26.03.2015	7	3.3 Applicable Connectors	Added connections
27.10.2015	3	1.2 Electrical Requirements	Table split
09.03.2016	5	1.2 Electrical Requirements	Graphics added
28.04.2016	14	7 Mounting	Graphics distances
30.11.2016	11	5 Buffer Battery	Battery monitoring added
17.08.2017	5 9	1.4 Environmental Conditions 3.3 Applicable Connectors	Pollution Degree Sleeve length added Added info regarding ultrasonically welded strands
18.10.2017	11 17	3.4 Label Field 7 Mounting	Added chapter Graphic replaced
19.06.2018	4	1.2.1 Module Supply	Note UL conditions
20.09.2018		3 Connector Layout	Note added
04.11.2020	17	7 Mounting	Expansion functional ground connection

