

DOCUMENTATION

OS Box Series 600

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1. Introduction

1.1. About this documentation

- This documentation is an aid for installation, commissioning, use and maintenance of the product manufactured by PLEVA GmbH.
- This documentation contains safety instructions which must be observed.
- Observance of the documentation will help you to operate the product error-free, to take the correct actions in the event of faults and to perform maintenance work.
- Anyone working with / on this product must read the documentation and observe the applicable information and instructions.
- This documentation must be constantly available to the product operator on the premises.
- This documentation must always be complete and in legible condition.
- This documentation should be supplemented by existing national / local regulations on installation, use and accident prevention.

This documentation may not be duplicated or made accessible to third parties in whole or in part without special permission from PLEVA GmbH.

It must be treated confidentially. Offenders will be liable for damages.

The information provided in this documentation has been carefully checked. However, we cannot exclude deviations due to continuous further development of the product. No legal responsibility or liability is undertaken for any resulting damages.

Subject to technical changes without prior notice!

PLEVA GmbH accepts no liability for printing errors.
The German text is binding.

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1.2. Presentation of the safety instructions

In order to present the documentation clearly, important text passages are visually highlighted by the following icons and keywords (safety and warning notices, important information):



ATTENTION! – Dangerous electrical voltage

Legend



ATTENTION! – Dangerous situation / General danger

Legend



ATTENTION! – Hot surface / Warm

Legend



ATTENTION! – Risk of trapping / Injury to hands

Legend



STOP! - Warning of possible injury

Legend



Information!

Legend

2. Safety Instructions

General safety and use instructions

The product manufactured by PLEVA GmbH complies with the state-of-the-art and recognized safety regulations.

However, improper use of the product and / or disregard of the safety instructions can result in serious danger for the user or third parties. Damage or destruction of the product or other property can also not be excluded in this case.

- Observe all safety regulations prior to commissioning!
- All work on the product for the purposes of transportation, installation, commissioning and repair must be carried out by qualified, expert personnel (in accordance with DIN VDE 0100 and similar, as well as local regulations)!
- Clearly define staff responsibility for commissioning, operation and maintenance of the product!
- Only use the product in technically perfect and proper condition.
- Operate the product in a safety- and danger-conscious manner, observing the documentation!
- Discontinue use of the product immediately if safety defects become evident!
- Eliminate faults that affect safety immediately!
- Do not make any changes to the product which may impair safety!
- Keep warning notices (signs, icons etc.) on the product in legible condition and do not remove!

Safety before switching on and during operation

- Check all existing safety devices before switching on!
- Check that no third parties will be endangered by switching on / actuation of the product or system!
- Do not de-activate existing protection and safety devices during normal operation!
- Report all visible defects of the product immediately – in the event of immediate danger, stop the product / system immediately!
- Do not work with / ply objects (e.g. tool, cleaning agent) etc. on the switched on product / system!
- Do not reach into rotating parts when the system is switched on – keep away from moving machine parts!

Safety during servicing and maintenance work

- The servicing and maintenance tasks prescribed in the documentation, together with the relevant schedule, must be observed!
- In order to prevent personal injuries and damage to property, the servicing and maintenance tasks must be carried out circumspectly and only by suitably qualified expert personnel!
- Before working on the electrical system disconnect it from the mains, check that it is voltage-free and protect it against unauthorized switching on (main switch OFF)!
- If it is essential for the product / system to be in operation during maintenance work, only switch on the power supply for this period. Exercise particular caution to ensure that no persons are injured or property damaged. Observe the safety instructions and warning information provided in the documentation!
- If decommissioning of safety devices is unavoidable for maintenance and setup work, this may only be done by specially authorized personnel. Observe the safety instructions and warning information provided in the documentation. After completing the work, re-commission the safety devices and check them for functionality!
- Check the electrical system regularly (sound contact points, insulation o.k. ...), and eliminate all defects immediately!
- Do not clean electrical components / subassemblies with water or other liquids!
- Exercise caution when handling hot system components and process materials; risk of burning!
- When handling consumables (e.g. oils, greases and other chemical substances), observe the safety regulations applicable for the product!

3. Oxygen Sensors OS O and OS H

3.1. Technical description

The heated sensor (temperature > 700 °C) has two electrodes. One of these electrodes is exposed to the process air and the other one is exposed to the environmental air. The sensor creates a voltage signal depending on the oxygen-difference between the process air and the room air. This signal is processed by the instrumental pre-amplifier for further use with the evaluation electronics OS Box. With the help of a microcomputer, this evaluation electronics calculates an oxygen value based on the signals from the pre-amplifier. Oxygen content is displayed in volume percentage (Vol% O₂) and below 10000 ppm in ppm, additionally. Saturation of steam (humidity) can be measured for a pure water steam and oxygen mixture in addition. It is displayed in volume percentage (Vol% H₂O).

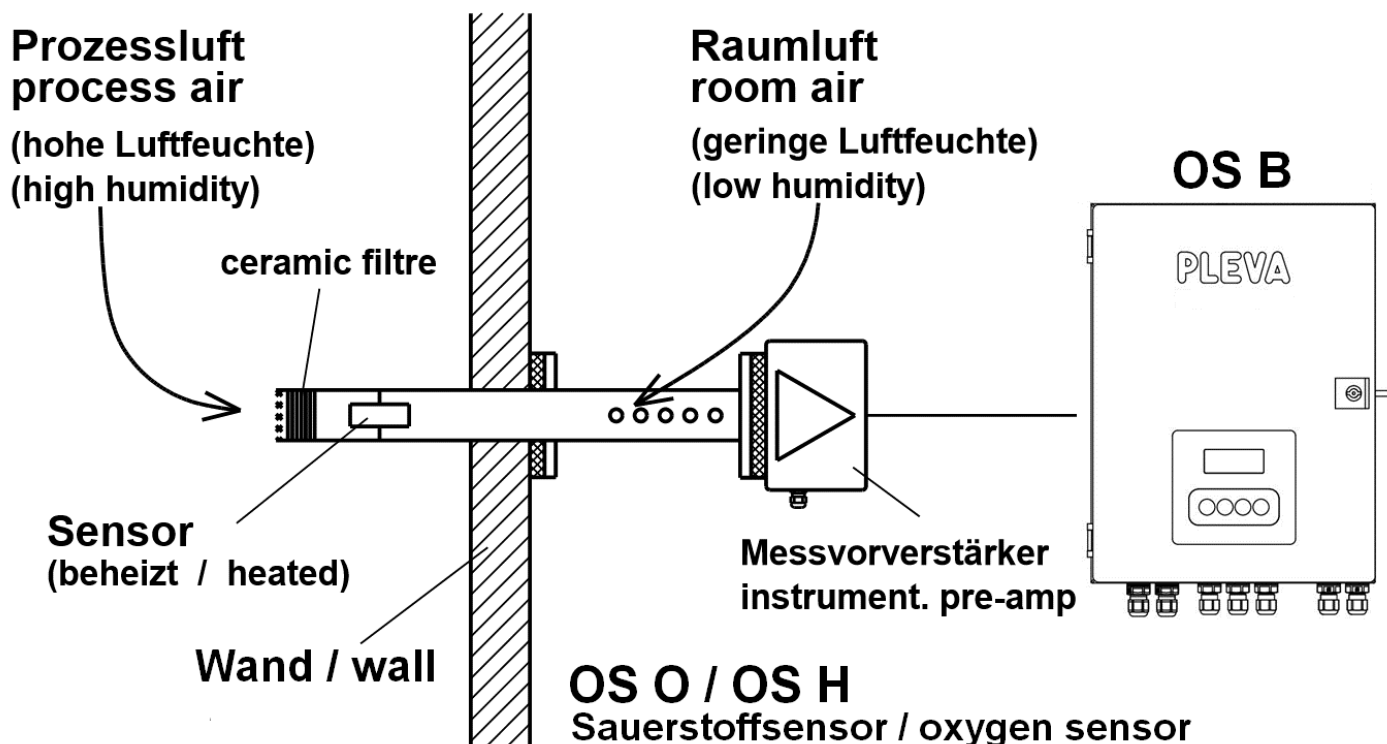


Figure 1: Measuring arrangement / Measuring principle

The instrument preamplifier of the sensor also delivers a special reference current to the evaluation electronics OS Box. This current is specially adjusted to each sensor at the factory. This guarantees the problem-free replacement of measurement sensors.

Two types of sensors can be used depending on measurement range: Sensor type OS O measures from 0...10 Vol% O₂, sensor type OS H measures from 0,5...21 Vol% O₂. Sensor type OS O is preferably used for measuring oxygen, whereas sensor type OS H is especially for water steam and oxygen mixtures. Display of moisture in Vol% H₂O can be (de)selected in the configuration menu. In the evaluation electronic OS Box, used sensor type must be chosen correctly.

Each sensor type is available as standard model (OS O ST or OS H ST) for process air temperatures up to 250° C and as a high-temperature version (OS O HT or OS H HT) for process air temperatures up to 600° C.

3.2. Precautionary measures

The appropriate **VDE regulations** and **local regulations must be observed** during installation, commissioning and use. All transport, installation, commissioning and repair work must be carried out by qualified specialists (in accordance with DIN VDE 0100 or similar).

Further precautionary measures:

- The **supply voltage** must **correspond with the specification stated on the rating plate**.
- Wire up the unit completely before applying the supply voltage.
- **Electronic boards** must **not be removed or attached** when the **unit is connected** to the **supply voltage**.
- **Holes in the measuring tube** of the sensor must **not be covered** - environmental air must be able to enter unhindered.
- **Sensor** must be **protected against splash water**.
- **Caution: The measurement tube of the measuring sensor becomes very hot during operation, because the inside of the sensor is heated up to approx. 700 °C.**

3.3. Assembly

The sensor has to be mounted in the first third of the steamer, meaning in the area where the chemical reaction begins. In this area the presence of oxygen is particularly critical. The humidity sensor should be placed around 100 mm below the lower edge of the textile. For loop steamer it should be 100 mm below the lower edge of the loops.

The sensor must not be placed in immediate proximity of the exhaust ventilation or steam feed pipe. The sensor has to be protected against splash water. If necessary, a splash water protection has to be installed. Drilled holes in the measuring pipe must not be covered. The room air must be able to enter unhindered.

When selecting the installation site, ensure that the instrument preamplifier of the sensor is not in the immediate proximity of greatly warmed machine components (e.g. heating line).

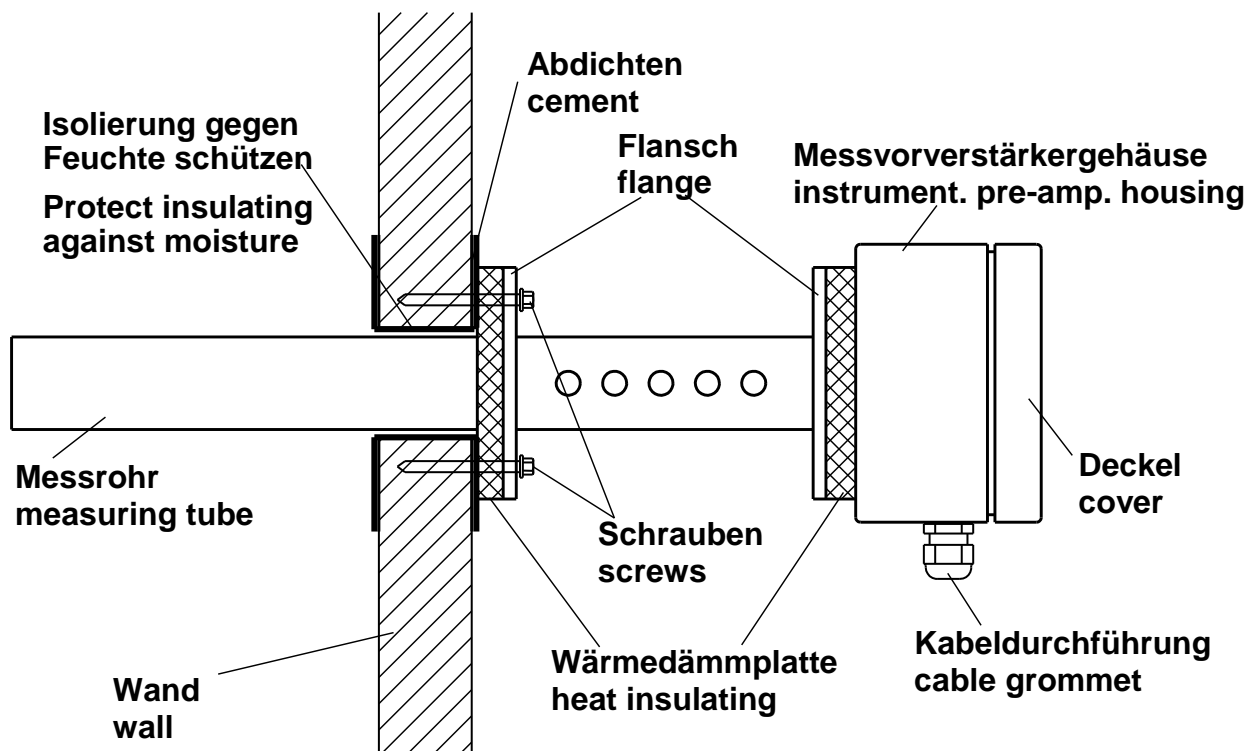


Figure 2: Mounting of the OS O and OS H oxygen sensor.

The measuring tube of the sensor must be well sealed where it passes through the dryer wall. Process air and environmental air must not meet at this point. A heat insulation plate is secured to the flange with a cable tie. (Transport safeguard. Remove during installation).

3.4. Electrical connections

The connection of the sensor OS O / OS H to the OS Box should be done via a shielded cable 7x 0.75 mm² according to the connection diagram:

	Sensor	Electronic box
Power supply (24 Volt)	POWER 24 V	24 V
	POWER GND	GND
Measurement signals	OUT 2 +	AI 1
	OUT 2 -	GND
	OUT 1 +	AI 2
	OUT 1 -	GND

3.5. Calibration

Calibration is necessary:

- for the first start-up
- after repair / replacement of the sensor or the board inside the sensor

Additionally the calibration procedure should be repeated approx. every 2 months.

IMPORTANT: - Before calibration of the OS O or OS H it is necessary to have:

- **20 min. power on** (for heating-up the sensor)
- **30 min. no fabric inside** dryer or heat set chamber
- **30 min. no gas burners on or no steam supply** for heat set chamber

To provide assistance, the sensor also can be calibrated when removed outside the dryer. If doing so, you have to connect a protective ground wire cable from the installation place to the flange of the sensor.

The operator's actions for calibration are described in section 6.2.

4. Processing unit OS Box

4.1. Mounting

The evaluation unit OS Box must be installed outside the heat treatment machine. The ambient temperature of the evaluation electronics must not exceed 50 °C at maximum!



Information!

- The evaluation unit involves measuring preamplifier, the microprocessor evaluation, serial and analogue outputs.
- Ambient temperature of the box must not exceed 50 °C
- Preferentially the box should be mounted by spacers (rubber buffers) to the dryer wall. So the updraft on the dryer wall can be used for normal cooling (Figure 4)

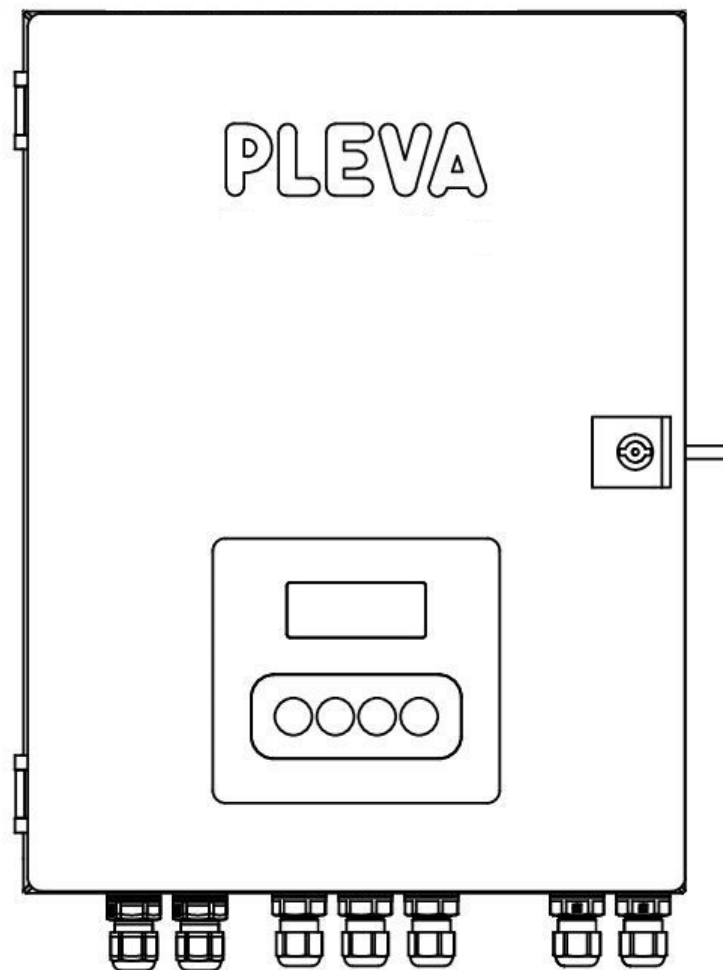


Figure 3: View of the OS Box

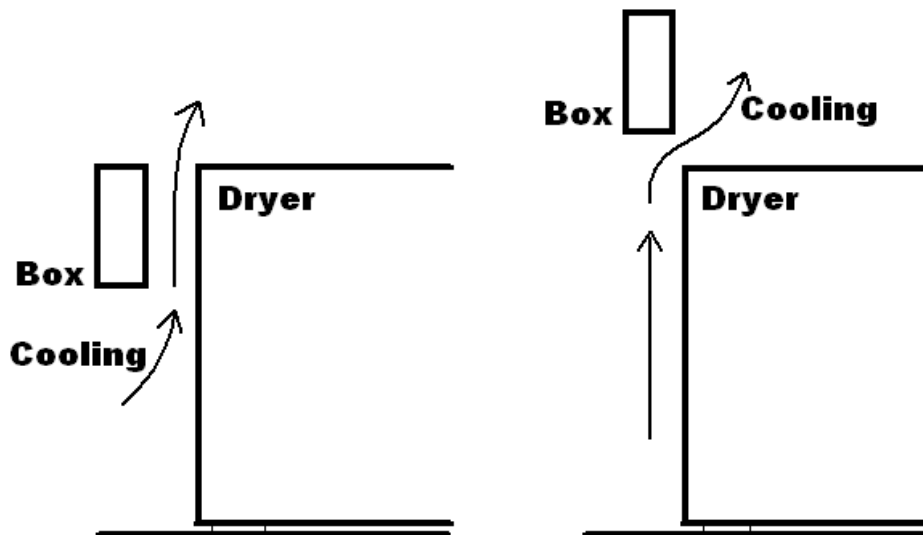


Figure 4: Proposal of mounting at dryer wall

4.2. Power supply

- **Supply voltage: 24 V DC**, 1.6 A (with one OS sensor connected); terminals on the right side of the box below the covering.
Connecting more electronic boxes to the supply voltage can be done by daisy-chaining on the second connector row of the terminals.
- The power supply of the OS Box has to be connected with a **shielded cable 3 x 0.75 mm²**
- The **Box has to be grounded for potential equalization** on the earth screw outside the housing to PE of the machine!

4.3. RS 485 bus

The RS-485 bus (terminals A, B, 485GND, SHLD on the main board) can be used for transmitting the measurement information to a PLC or a central computer. This system addresses the OS Box periodically. The addressed box writes the measurement values to the Bus.

For data transmission, several different protocols can be used:

- (1) **MININET** protocol (from Bernecker & Rainer): Every box has an address on which all the data is available.
- (2) **PLEVA** protocol: This protocol is used for compatibility with the predecessor system. There are "virtual boxes" with 4 TDS measuring values, 1 FS/OS value, or 3 RR values each. Accordingly, the system has multiple addresses (max. 8) for data exchange.
- (3) **PLEVA 2** protocol: also allows the addressing of virtual boxes, but the data content makes better use of the system. For example certain readings are offered in different measurement units. A direct compatibility with old boxes does no longer exist.
- (4) **MODBUS** protocol: Every box has an address on which all measurement data are available. Supported Modbus instructions are read and write data and selected diagnostic instructions.

A detailed description of the RS485 interface is available on request from company PLEVA.

For the bus signals (A, B, 485GND) a shielded cable with a maximum of 3 x 0.75 mm² or better: a twisted pair cable 2 x 2 x 0.5 mm² has to be used.

4.4. Current outputs

The pluggable board MP1 (optional) contains 8 analog outputs (0/4 ... 20 mA). The assignment of measuring values to the current outputs can be shown in the wiring diagram. The measuring value assignment at factory settings is as follows:

	O ₂	H ₂ O
Start of measuring range (0/4 mA)	0 Vol % O ₂	0 Vol % H ₂ O
End of measuring range (20 mA)	25 Vol % O ₂	100 Vol % H ₂ O

These assignments can be changed in the configuration menu.

4.5. Shield connection

The shields of the cables for the power supply and RS485 bus can be looped through to the next box separately. Cut the isolation of the cable with a knife and pull it open approx. 2 cm so the shield connector can ensure a good contact to the shield. (See photo on this page and connection diagram in the appendix)



Figure 5: shield connecting clamp

4.6. Error relays

The evaluation unit OS Box has a relay (dry contact, max. 220 VDC/250 VAC, max. 3A). Through this relays, errors or reaching the limit of a measuring range can be signaled. The upper and lower limit of the measuring range can be set in the configuration menu.

Terminals in box	Description
NC – COM	open = No error and within measuring range. connected = Error or out of measuring range.
NO – COM	open = Error or out of measuring range. connected = No error and within measuring range.

4.7. Initial start-up

All sensors and the evaluation unit OS Box have to be connected as shown in section 4.1 to and the connection diagrams. Afterwards, the supply voltage can be switched on.

Before using the measuring instrument in the production process, a first calibration must be performed. In this matter the requirements described in section 3.5 must be completely fulfilled. The procedure for calibration is described in section 6.2. All current parameters must be checked in the information menu (see section 6.3) to see if they match the specific application. Changes can then be made in the configuration menu (see section 6.4).

5. Operating and display elements

5.1. Status display

On the main board a status display with 8 light emitting diodes (LEDs) can be found:

LED	Colour	Meaning when illuminated
1	yellow	Data is available on the RS485 bus
2	yellow	RS485 bus active (data transmission)
3	yellow	Calibration active
4	yellow	Setup mode active
5	yellow	Configuration mode active
6	yellow	Information mode active
7	green	Measuring cycle (blinking)
8	red	Boot process or error

5.2. Integrated display

The integrated display is used to display the measured values, to do the calibration, setting the current loop outputs (0/4 ... 20 mA), the serial interface (RS-485) and other parameters. The handling is described in Section 6.

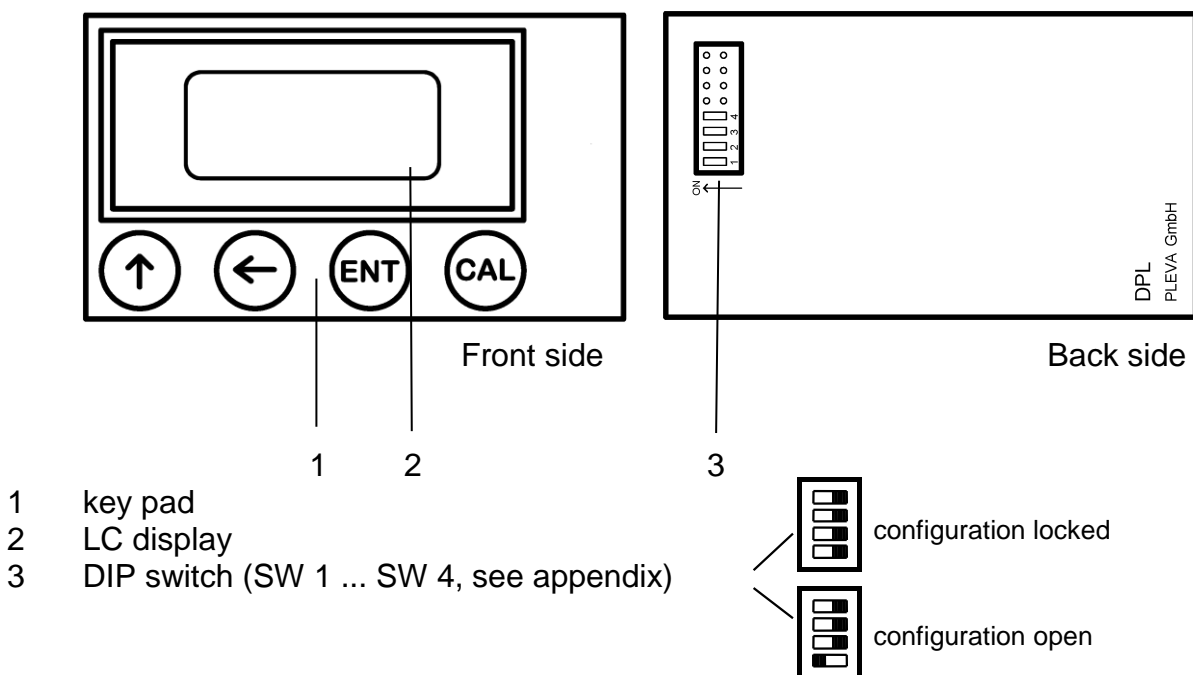


Figure 6: View of the integrated display

The keys have the following functions:

- ↑ "Increasing" within the available input range or "scrolling" in a menu;
- ← "Decreasing" within the available input range;
- Note: All inputs always have to be confirmed by "ENTER" (ENT);
- ENT** "ENTER"; Confirmation of selected inputs; moves on to the next window;
- CAL** Calibration of the measuring sensors

6. Operation

After switching on the supply voltage, the software version is displayed in the start window:

```
V 2.0 – 16.2.2015  
PLEVA GmbH GERMANY  
www.pleva.org
```

After a few seconds the measuring mode starts automatically (LED 7 flashes, then the red LED turns off).

6.1. Display of measured values

By pressing the **ENT** key several times, all in the measurement values that are defined can be displayed (only the actual connected sensors are shown):

Oxygen concentration
(only one sensor
connected)

```
OXYGEN (O)  
0.7 Vol%O2
```

Oxygen concentration
(overview of all sensors)

```
OXYGEN (O)  
(1) 0.7 Vol%O2  
(2) 1.2 Vol%O2  
(3)
```

Oxygen concentration
(one sensor out of all
the connected sensors)

```
OXYGEN (O)  
(1) 0.7 Vol%O2
```

Oxygen concentration
is also displayed in ppm
if <10000; display
Vol% H2O selected

```
OXYGEN (O)  
0.26 Vol% O2  
2565 ppm O2  
98.8 Vol% H2O
```

6.2. Calibration

For calibrating a sensor, first select the display with the measured value (see section 6.1), related to the sensor that is to be calibrated.

```
OXYGEN (O)  
(1) 20,8 Vol%O
```

Pressing the key **CAL** (approx. 2 sec) starts the calibration mode:

```
-- CALIBRATION --  
OXYGEN SENSOR (1)  
SURE ? > NO  
PRESS ENT
```

For the calibration of the sensors you have to change from **NO** to **YES** by using the **↑** key. Then continue with **ENT** key.

The humidity sensor OS O or OS H has to be turned on for 20 minutes (heating) before it can be calibrated.

**OXYGEN SENSOR
IS READY AND 20MIN
HEATED ? > NO
PRESS ENT**

For calibration the notification **NO** must be changed to **YES** with the **↑** key, again. By pressing **ENT** the calibration is continued.

If you press the **ENT** at the prompt **NO** the calibration procedure is exited at all levels.

In the following screens, the previous calibration and actual measurement values are compared.

oxygen sensor

**--- CALIBRATION ---
CAL - 7.0 mV
ACT - 6.6 mV
STORE → PRESS ENT**

Press the **ENT** key to store the calibration. With any other button the calibration can be cancelled for the last time. When the calibration procedure has finished the new and old calibration values will be displayed for a short time.

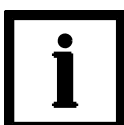
6.3. Information menu

The factory pre-setting and the current device parameters can be displayed in the information menu. It is not possible to change any settings in the information menu. For this you have to use the configuration menu (see section 6.4).

To enter **information menu**, simultaneously press the keys **←** and **ENT** for approx. 2 sec. The following message appears after the selection is done:

****INFORMATION**
CURRENT PARAMETERS
AND FACTORY SETTINGS
CONTINUE WITH ENT**

The parameters are displayed after the **ENT** key is pressed. Switching to the next parameter page is always performed with the **ENT** key. Scrolling back is done by pressing the **←** key. The device automatically returns to the measuring mode after the last message.



Information!

It is not possible to change settings at the information menu!

Displays of the information menu:

<p>OXYGEN (O)</p> <p>-----</p> <table> <tr> <td>possible</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>used</td> <td>x</td> <td>x</td> <td>--</td> </tr> </table>	possible	x	x	x	used	x	x	--	<p>Displays the amount of sensors that can be connected with the available hardware (possible), and the amount of sensors that are actually connected (used)</p>
possible	x	x	x						
used	x	x	--						
<table> <tr> <td>OXYGEN (O)</td> <td>OSO (1)</td> </tr> <tr> <td>ACT 3.3 mA</td> <td>- 3.5 mV</td> </tr> <tr> <td>CAL</td> <td>- 7.0 mV</td> </tr> <tr> <td>REF 11.6 mA</td> <td>GAS</td> </tr> </table>	OXYGEN (O)	OSO (1)	ACT 3.3 mA	- 3.5 mV	CAL	- 7.0 mV	REF 11.6 mA	GAS	<p>Detailed information for sensors: ACT = actual value in mA and mV; CAL = calibration value in mV; REF = reference current in mA; GAS = calculation formula for gas heating.</p>
OXYGEN (O)	OSO (1)								
ACT 3.3 mA	- 3.5 mV								
CAL	- 7.0 mV								
REF 11.6 mA	GAS								
<table> <tr> <td>OXYGEN (O)</td> <td>OSO (2)</td> </tr> <tr> <td>ACT 3.3 mA</td> <td>- 3.5 mV</td> </tr> <tr> <td>CAL</td> <td>- 7.0 mV</td> </tr> <tr> <td>REF 11.6 mA</td> <td>GAS</td> </tr> </table>	OXYGEN (O)	OSO (2)	ACT 3.3 mA	- 3.5 mV	CAL	- 7.0 mV	REF 11.6 mA	GAS	<p>the same for sensor (2)</p>
OXYGEN (O)	OSO (2)								
ACT 3.3 mA	- 3.5 mV								
CAL	- 7.0 mV								
REF 11.6 mA	GAS								
<p>OXYGEN (O)</p> <p>-----</p> <p>DEWPOINT: 10 °C</p>	<p>Displays the dew point value that is used for the calculation of the humidity value.</p>								
<table> <tr> <td>ANALOG OUT 0...20mA</td> </tr> <tr> <td>1 2 3 4 5 6 7 8</td> </tr> <tr> <td>-----</td> </tr> <tr> <td>O H O H O H - -</td> </tr> </table>	ANALOG OUT 0...20mA	1 2 3 4 5 6 7 8	-----	O H O H O H - -	<p>Output assignment of the analogue output board. H=HUMIDITY</p> <p>(only if analogue output board is available)</p>				
ANALOG OUT 0...20mA									
1 2 3 4 5 6 7 8									

O H O H O H - -									
<table> <tr> <td>OUTPUT 0...20mA</td> </tr> <tr> <td>(O) 000...025 %O2</td> </tr> <tr> <td>(H) 000...250 %H2O</td> </tr> </table>	OUTPUT 0...20mA	(O) 000...025 %O2	(H) 000...250 %H2O	<p>Conversion of the measuring units for OXYGEN (O) and HUMIDITY (H) to the output signals 0/4...20mA</p> <p>(only if analogue output board is available)</p>					
OUTPUT 0...20mA									
(O) 000...025 %O2									
(H) 000...250 %H2O									
<p>* PARAMETER RS485 *</p> <p>BAUDRATE: 19,2 kBd</p> <p>PROTOCOL: MININET</p> <p>ADDRESS: 21 H</p>	<p>Parameters of the RS485 interface for MININET protocol</p> <p>Last line: address (11...2F hex)</p>								
<p>* PARAMETER RS 485 *</p> <p>BAUDRATE: 19,2 kBd</p> <p>PROTOCOL: PLEVA</p> <p>BOX/ADR: 01 / 80H</p>	<p>Alternatively, the parameters of the RS485 interface for protocol PLEVA und PLEVA-2</p> <p>Last line: box number (decimal) and first address byte (hexadecimal)</p>								
<p>* PARAMETER RS 485 *</p> <p>BAUDRATE: 19,2 kBd</p> <p>PROTOCOL: MODBUS</p> <p>ADDRESS: 1</p>	<p>Parameters of the RS485 interface for MODBUS protocol.</p> <p>Last line: address (1 ... 247, decimal)</p>								
<p>**** DAMPING ****</p> <p>OXYGEN (O) 03</p>	<p>Displays the damping values for the different humidity calculation.</p>								

<p>CORRECTION OXYGEN 1</p> <p>* 1.05 + 0.8</p>	<p>Displays the measurement correction value of the particular sensors as a fixed factor and an offset value for a linear equation: $new = old * fixed\ factor + offset$; (only displayed if sensor values have been corrected)</p>
<p>OSB V2.0 - 16.7.2015</p> <p>SWITCHED ON 5 H</p> <p>END OF INFORMATION</p>	<p>Program version, date Switched-on-time (this is the last page – therefore the last possibility to scroll back)</p>

6.4. Configuration menu

Changing settings is only possible in configuration menu. The following parameters can be set or changed:

- Definition of sensor types (gas heating) and dew point
- Measuring value correction, damping
- Configuration of the serial interface RS485
- Configuration of the current outputs

For testing purpose of connected devices it is possible to output a current from 0 to 20 mA on the analog outputs in 1mA steps.

The configuration menu can be entered by simultaneously pressing the two outer buttons (↑, CAL). (DIP switch 1 on the displays back side has to be ON)



Information!

The configuration menu can **only** be entered if the **DIP switch** settings is set to "**Configuration open**" (see Figure 6).

***** CONFIGURATION *****

INPUT

PARAMETER

CONTINUE WITH ENT

Use **ENT** key to enter the configuration menu.

General rules:

- (1) If numerical inputs or a selection from a list is required, it is indicated by a flashing ►-sign on the display;
- (2) Numerical inputs are made with the ↑ key (count up) and the ← key (count down);
- (3) When selecting an option from a list (e.g. sensor type, or YES / NO) you will get the next value with the ↑ key.
- (4) Confirm the selection with the **ENT** key.

Entries in the configuration menu:

<p>* SENSOR DEFINITIONS * CHANGE SETTINGS ? SURE ? ▶ NO PRESS ENT</p>	<p>Settings for sensor definitions, can be skipped with NO. If YES, all possible sensor definitions can be selected.</p>
<p>CONFIGURATION OS SENSOR TYPE INDEX: (1) TYPE: ▶ OSO</p>	<p>Chose the type of sensor with the ↑ key (OS O or OS H), confirm with ENT key.</p>
<p>CONFIGURATION OXYGEN (O) ALL SENSORS DEWPOINT: ▶ 10 °C</p>	<p>If more than one sensor is connected the dew point has to be selected separately. It is valid for all sensors.</p>
<p>SHOW HUMIDITY VALUE ? ▶ NO PRESS ENT</p>	<p>Here can be chosen if in addition to the oxygen concentration, the humidity value should be displayed as well.</p>
<p>DAMPING OXYGEN ▶ 03</p>	<p>Input of the damping values: 0 = basic damping; 1, 2, 3, 4... increase of damping. Default: 3</p>
<p>VALUE CORRECTION CHANGE SETTINGS ? SURE ? ▶ NO PRESS ENT</p>	<p>Settings for a correction of measuring values can be made, if YES is selected. Switch from NO to YES by pressing ↑.</p>
<p>VALUE CORRECTION OXYGEN (1) ▶ OFF</p>	<p>No measurement correction (OFF) or Correction with one pair of values (1 POINT) or Correction with two pairs of values (2 POINTS) Confirm with ENT</p>
<p>* VALUE CORRECTION * 00.0 => 00.0 Vol% ▶ 20.5 => ▶ 20.6 Vol%</p>	<p>Next screen for 1 POINT correction: First value pair is always 0.0 / 0.0; only the input of the second pair of values (old value and new value) is required</p>
<p>* VALUE CORRECTION * ▶ 10.0 => ▶ 10.0 Vol% ▶ 20.5 => ▶ 20.6 Vol%</p>	<p>Next screen for 2 POINT correction: Input of both pairs of values is required; Input limits: 10-100 Vol%;</p>
<p>VALUE LIMITS CHANGE SETTINGS ? SURE ? ▶ NO PRESS ENT</p>	<p>Settings for the limit monitoring can be skipped with NO. By choosing YES the value limits can be set. Switching from NO to YES with ↑ key.</p>

<p>OXYGEN LIMITS</p> <p>LOW ▶ 000.0 Vol%</p> <p>HIGH ▶ 025.0 Vol%</p>	<p>Setting the lower an upper limit for the oxygen concentration.</p>
<p>CURRENT OUTPUT CHANGE SETTINGS ? SURE ? ▶ NO</p> <p>PRESS ENT</p>	<p>All current output settings can be made, if YES is selected.</p> <p>Switch from NO to YES by pressing ↑.</p>
<p>* CURRENT OUTPUT *</p> <p>TYPE: ▶ 0...20mA</p>	<p>Current output type can be 0...20mA or 4...20mA. Use ↑ key to choose between those two options.</p>
<p>CURRENT OUTPUT SCALING (O)</p> <p>▶ 0000 Vol% => 0 mA</p> <p>▶ 0025 Vol% => 20 mA</p>	<p>Scaling of the analogue output: Enter the oxygen concentration value in Vol% for the output of 0 mA, then do the same for 20 mA.</p> <p>Limits: 0/4mA: 0-99 Vol%; 20mA: 1-100 Vol%</p>
<p>CURRENT OUTPUT SCALING (H)</p> <p>▶ 0000 Vol% => 0 mA</p> <p>▶ 0100 Vol% => 20 mA</p>	<p>Scaling of the analogue output: Enter the humidity value in Vol% for the output of 0 mA, then do the same for 20 mA.</p> <p>Limits: 0/4mA: 0-99 Vol%; 20mA: 1-100 Vol%</p>
<p>CURRENT OUTPUT TEST 0-20mA AT ALL TERMINALS ? ▶ NO</p> <p>PRESS ENT</p>	<p>Test of the analogue output board. Can be skipped with NO. For testing the analogue outputs select YES.</p>
<p>TEST ALL ANALOG OUTPUTS AT: 10 mA</p> <p>PRESS ENT</p>	<p>With the keys ↑ and ← the output current of all output channels can be set between 0 and 20 mA in 1 mA steps.</p>
<p>RS485 INTERFACE CHANGE SETTINGS ? SURE ▶ NO</p> <p>PRESS ENT</p>	<p>Configuration of the RS485 interface. Can be skipped with NO. If you select YES, Settings like baud rate, protocol etc. can be made.</p>
<p>* PARAMETER RS 485 *</p> <p>BAUDRATE: ▶ 19,2 kBd</p> <p>PROTOCOL:</p> <p>ADDRESS:</p>	<p>Parameters of the RS485 interface: with the ↑ key, the baud rate can be selected (2400Bd, 4800Bd, 9600Bd, 19.2 kBd, 38.4kBd, 57.6kBd, 115kBd)</p>
<p>* PARAMETER RS 485 *</p> <p>BAUDRATE: 19,2 kBd</p> <p>PROTOCOL: ▶ MININET</p> <p>ADDRESS:</p>	<p>Parameters of the RS485 interface: with the ↑ key, the baud rate can be selected (MININET, PLEVA, PLEVA-2 or MODBUS)</p>

*** PARAMETER RS 485 ***
BAUDRATE: 19,2 kBd
PROTOCOL: MININET
ADDRESS: ► 21 H

Parameters of the RS485 interface:
with the keys **↑** and **←** selection of the MININET
address (valid addresses: 11 ... 2F hex);
confirm with **ENT**

*** PARAMETER RS485 ***
BOX ► 01

Parameters of the RS485 interface:
Change the box no. with the **↑** and **←** keys and con-
firm with ENT; The Pleva bus addresses are selected
and displayed automatically.

*** PARAMETER RS 485 ***
HUM/OXY: 82H-84H

PLEVA addresses are displayed

*** PARAMETER RS 485 ***
BAUDRATE: 19,2 kBd
PROTOCOL: MODBUS
ADDRESS: ► 1

Parameters of the RS485 MODBUS interface:
Select address with the **↑** and **←** keys.
Range: 1 ... 247 dec;
confirmation with **ENT**



Information!

The measuring value correction must not be larger than 3 %, otherwise the cor-
rection will be denied. Correction of measuring range should only be done in es-
tablished exceptional cases. Improper asserts of measuring and correction values
result in false indication values!

7. Technical data

7.1. Oxygen sensors OS O and OS H

OS O ST	measuring range O ₂ : 0...10 Vol% max. 250 °C (standard temperature)
OS O HT	measuring range O ₂ : 0...10 Vol% max. 600 °C (high temperature)
OS H ST	measuring range O ₂ : 0.5... 21 Vol% measuring range H ₂ O: 0... 20 Vol% max. 250 °C (standard temperature)
OS H HT	measuring range O ₂ : 0.5... 21 Vol% measuring range H ₂ O: 0... 20 Vol% max. 600 °C (high temperature)
Process air temperature:	up to 250 °C (ST) up to 600 °C (HT)
Probe temperature:	> 700 °C
Heating-up time of the measuring sensor:	approx. 20 min
Ambient temperature for measuring preamplifier:	max. 70 °C
Supply voltage:	direct voltage 24 V DC (± 10 %)
Power consumption:	max. 24 W
Current:	max. 1 A
Fuse:	4 A T
Probe weight:	approx. 2.6 kg

7.2. Evaluation electronics OS Box

Ambient temperature:	max. 50 °C
Supply voltage:	direct voltage 24 V DC (± 10 %)
Maximum no. of sensors:	3x OS O or OS H
Power consumption:	approx. 12 W electronic box only approx. 38 W with one sensor approx. 90 W with maximum number of sensors (3 sensors)
Current:	0.5 A electronic box only 1.6 A with one OS sensor 3.8 A with maximum configuration of sensors (3 sensors)
Fuse:	3.15 A M (only for protection of evaluation electronics OS Box)
Weight:	approx. 10 kg

APPENDIX

OS Box Series 600

Technical security

- EU Declaration of Conformity - Oxygen measuring device OS Box

Service

- Enable and special functions - DIP switch settings via display
- Brief check list

Conversion tables

- Conversion table of water content in other absolute humidity units
- Conversion table for high humidity

Assembly

- Dimensional drawing OS Box
- Dimensional drawing sensor OS O / OS H

Electrical diagrams

- Connection diagram OS Box
- Connection diagram sensor OS O / OS H



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Produktbezeichnung: Sauerstoffmessgerät OS Box
Product name: Oxygen measuring device OS Box

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

The named product is in conformity with the requirements of the following European Directive:

- 2014/35/EU (CE)** EU-Richtlinie Niederspannung (26. Februar 2014)
 EU-Directive Low voltage (26th February 2014)
- 2014/30/EU (CE)** EU-Richtlinie Elektromagnetische Verträglichkeit (26. Februar 2014)
 EU-Directive Electromagnetic compatibility (26th February 2014)

Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen:

Conformity with the requirements of these Directives is testified by complete adherence to the following standards:

Harmonisierte Europäische Normen / Harmonised European Standards

EN 55011:2011	EN 55022:2011	EN 55024:2011	EN 60097:1993
EN 60204-1:2008	EN 60529:2014	EN 61000-6-2:2011	EN 61000-6-4:2011
EN 61010:2011	EN 61326-1:2013	EN 61326-2:2013	EN 11111:2012

Nationale Normen / National Standards

DIN VDE 0100 DIN VDE 0110 DIN VDE 0701 VDE 0411-1 9. GPSGV

Die Installation und Inbetriebnahme des Gerätes hat unter Beachtung folgender Normen oder gleichartiger, landesspezifischer Vorschriften zu erfolgen:

The installation and commissioning of the product has to happen considering the following standards or homogenous, country-specific regulations:

DIN VDE 0100 DIN IEC 60364

Empfingen, den 20. April 2016

Dr. Ralf Pleva

Geschäftsführer / Managing Director

Diese Erklärung bescheinigt die Übereinstimmung mit der(n) genannten Richtlinie(n), ist jedoch keine Zusicherung von Eigenschaften im Sinne des Produkthaftungsgesetzes.

This Declaration certifies conformity with the above-mentioned Directive(s), but gives no assurance of properties within the meaning of the Law Concerning Product Liability.

Enable and special functions DIP switch settings via display

The DIP switches on the display board defines the access rights in various configuration and service levels and starts special functions. The DIP switches has the following settings:

	DIP switch	
4	ON <input checked="" type="checkbox"/>	only factory usage!
	OFF <input type="checkbox"/>	standard: OFF; don't change
3	ON <input checked="" type="checkbox"/>	only factory usage!
	OFF <input type="checkbox"/>	standard: OFF; don't change
2	ON <input checked="" type="checkbox"/>	only factory usage!
	OFF <input type="checkbox"/>	standard: OFF; don't change
1	ON <input checked="" type="checkbox"/>	configuration open
	OFF <input type="checkbox"/>	configuration closed

Brief check list (data from information mode) OS Box Series 600

Seriennummer:	Firma:
▼ Standard ▼	▼ Ihr Display ▼

OXYGEN (O) ----- possible x x x used x x x	OXYGEN (O) ----- possible used
--	--

OXYGEN (O) OSO (1) ACT x.x mA x.x mV CAL -7.0 mV REF xx.x mA	OXYGEN (O) (1) ACT mA mV CAL mV REF mA
---	--

OXYGEN (O) OSO (2) ACT x.x mA x.x mV CAL -7.0 mV REF xx.x mA	OXYGEN (O) (2) ACT mA mV CAL mV REF mA
---	--

OXYGEN (O) OSO (3) ACT x.x mA x.x mV CAL -7.0 mV REF xx.x mA	OXYGEN (O) (3) ACT mA mV CAL mV REF mA
---	--

OXYGEN (O) ----- DEWPOINT: 10 °C	OXYGEN (O) ----- DEWPOINT:
--	---

ANALOG OUT 0...20mA 1 2 3 4 5 6 7 8 ----- O H O H O H - -	ANALOG OUT ...20mA 1 2 3 4 5 6 7 8 -----
--	---

OUTPUT 0 ... 20 mA (O) 000 ... 25 % O2 (H) 000 ... 250 % H2O	OUTPUT ... 20 mA (O) (H)
---	---------------------------------------

* PARAMETER RS 485 * BAUDRATE: 9600 Bd PROTOCOL: MININET ADDRESS: 21 H	* PARAMETER RS 485 * BAUDRATE: PROTOCOL: ADDRESS:
---	--

* PARAMETER RS 485 * BAUDRATE: 9600 Bd PROTOCOL: PLEVA BOX/ADR: 01 / 82H	* PARAMETER RS 485 * BAUDRATE: PROTOCOL: ADDRESS:
* PARAMETER RS 485 * BAUDRATE: 9600 Bd PROTOCOL: MODBUS ADDRESS: 1	* PARAMETER RS 485 * BAUDRATE: PROTOCOL: ADDRESS:
* DAMPING * OXYGEN (O) 03	* DAMPING * OXYGEN (O)
	CORRECTION OXYGEN
	CORRECTION OXYGEN (2)
	CORRECTION OXYGEN (3)
OSB V 2.0 - 29.5.2015 SWITCHED ON xx MIN END OF INFORMATION !	OSB V - SWITCHED ON MIN END OF INFORMATION !

If you suspect errors, please fill in this form and send it to PLEVA GmbH.

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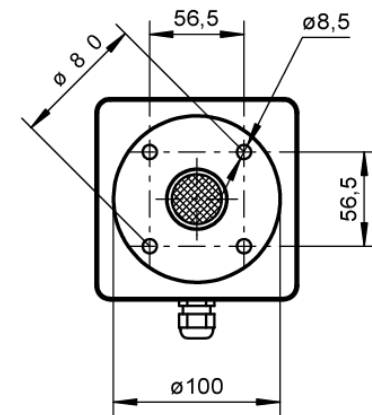
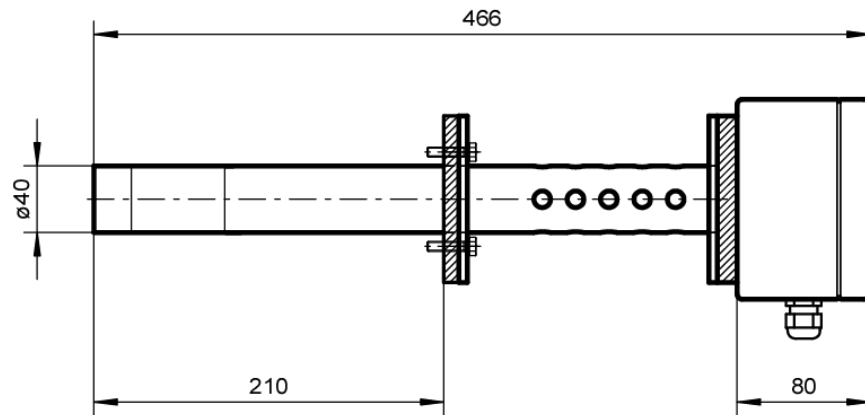
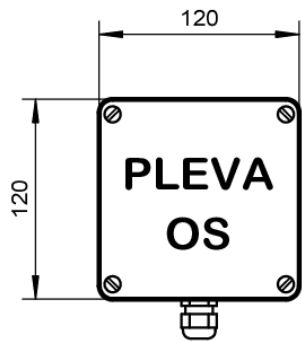
Conversion table of water content in different absolute humidity units

Reference pressure: 1013 mbar

Water content g/kg	Dew point °C	Volume percent Vol. %	Humidity g/m ³
10.0	13.7	1.6	12.0
20.0	24.7	3.1	22.7
30.0	31.3	4.6	32.8
40.0	36.2	6.0	42.3
50.0	40.1	7.4	51.5
60.0	43.2	8.8	60.3
70.0	46.0	10.1	68.7
80.0	48.3	11.4	76.9
90.0	50.4	12.6	84.7
100.0	52.2	13.9	92.3
110.0	53.9	15.0	99.6
120.0	55.5	16.2	106.7
130.0	56.8	17.3	113.6
140.0	58.1	18.4	120.2
150.0	59.4	19.4	126.7
160.0	60.5	20.5	132.9
170.0	61.5	21.5	139.0
180.0	62.5	22.4	145.0
190.0	63.4	23.4	150.7
200.0	64.3	24.3	156.3
210.0	65.2	25.2	161.7
220.0	65.9	26.1	167.1
230.0	66.6	27.0	172.2
240.0	67.3	27.8	177.3
250.0	68.0	28.7	182.2
260.0	68.6	29.5	187.0
270.0	69.3	30.3	191.6
280.0	69.9	31.0	196.2
290.0	70.4	31.8	200.6
300.0	70.9	32.5	205.0
310.0	71.4	33.3	209.3
320.0	71.9	34.0	213.4
330.0	72.4	34.7	217.5
340.0	72.8	35.3	221.5
350.0	73.3	36.0	225.3
360.0	73.7	36.7	229.1
370.0	74.1	37.3	232.8
380.0	74.6	37.9	236.4
390.0	75.0	38.5	240.0
400.0	75.3	39.1	243.5
410.0	75.7	39.7	246.9
420.0	76.0	40.3	250.3
430.0	76.3	40.9	253.6
440.0	76.6	41.4	256.8
450.0	76.9	42.0	259.9
460.0	77.2	42.5	263.0
470.0	77.5	43.0	266.0
480.0	77.8	43.6	269.0
490.0	78.1	44.1	271.9
500.0	78.4	44.6	274.8

Conversion table for high humidity

Dew point (°C)	Volume percent (Vol. % moist)	Water content (g/kg)
10	1,2	8
20	2,3	15
30	4,2	27
40	7,3	49
50	12,2	86
60	19,7	152
70	30,8	276
80	46,7	546
82	50,7	639
84	54,8	755
86	59,3	907
88	64,1	1110
90	69,2	1397
91	71,9	1590
92	74,6	1829
93	77,5	2141
94	80,4	2550
95	83,4	3134
96	86,5	3999
97	89,8	5468
98	93,1	8343
99	96,5	17233
100	100,0	∞

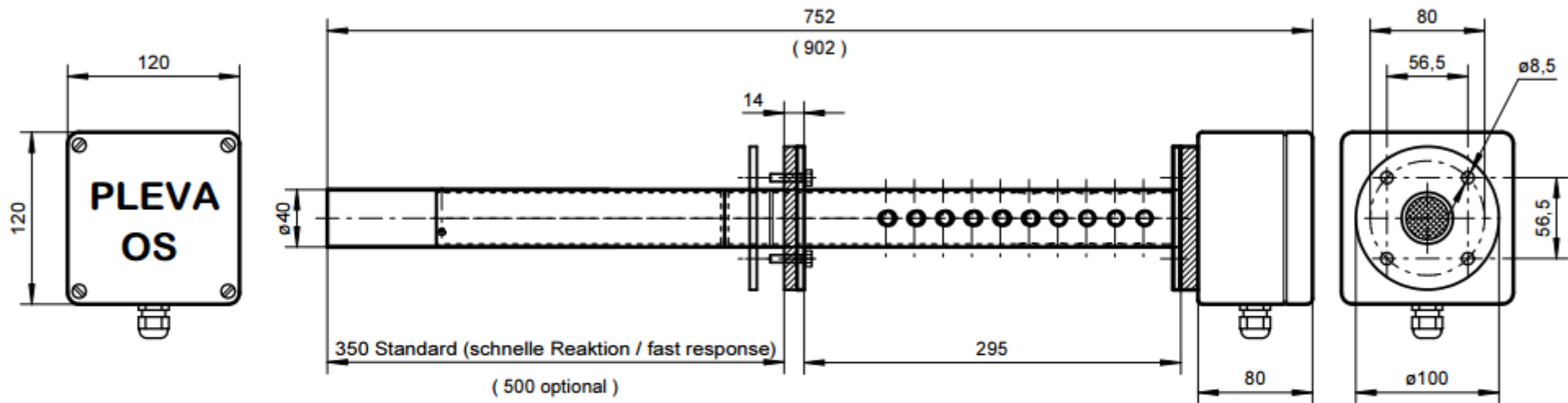


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Nr. 07.00.101.1
 30.06.15 *Fischer*

OS Box
Serie 600

Sensor OS ST
 Standard / standard

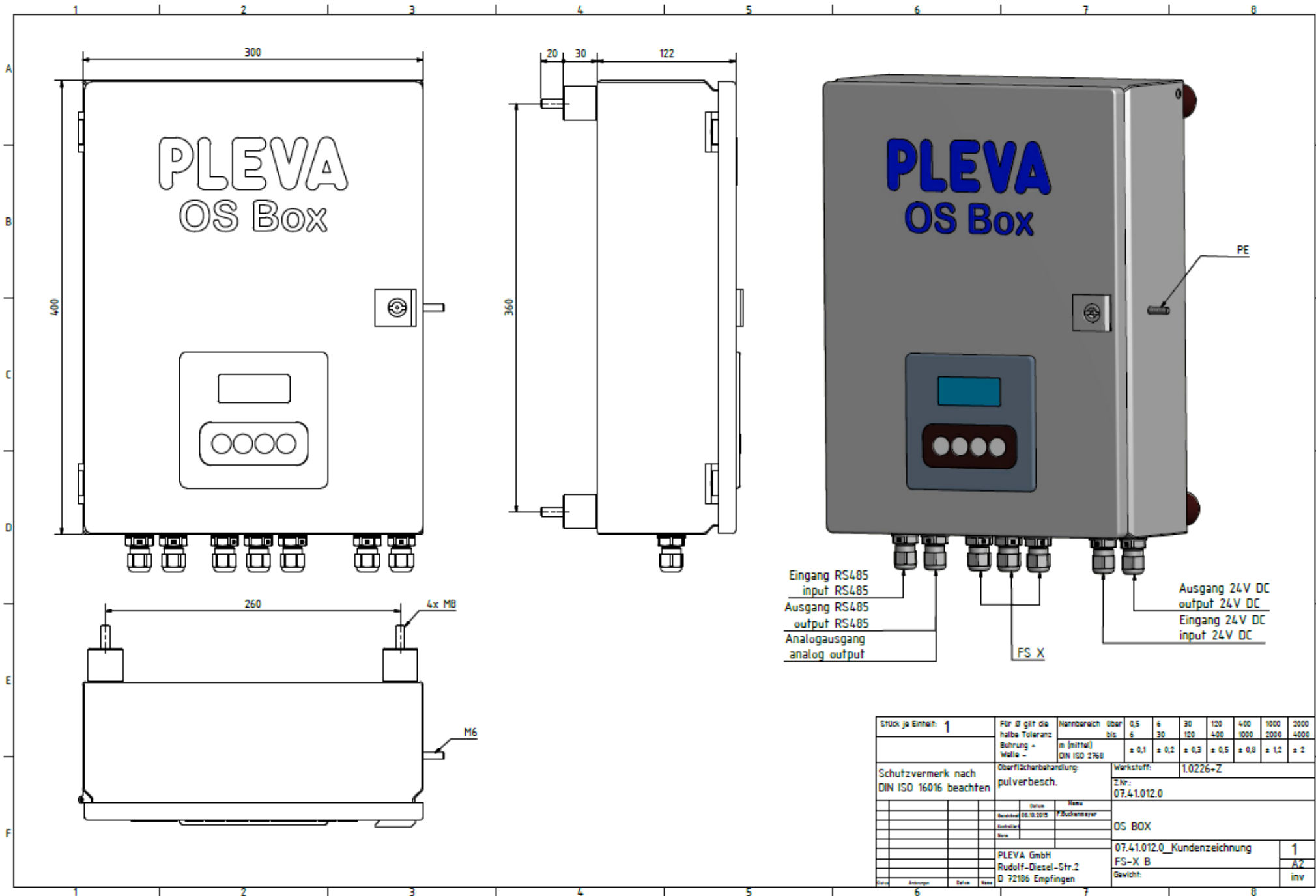


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Nr. 07.00.109.0
 02.09.15 Fischer

PLEVA Process Box
OS Box Serie 600

Sensor OS O HT / OS H HT
 Hochtemperatur / high temperature

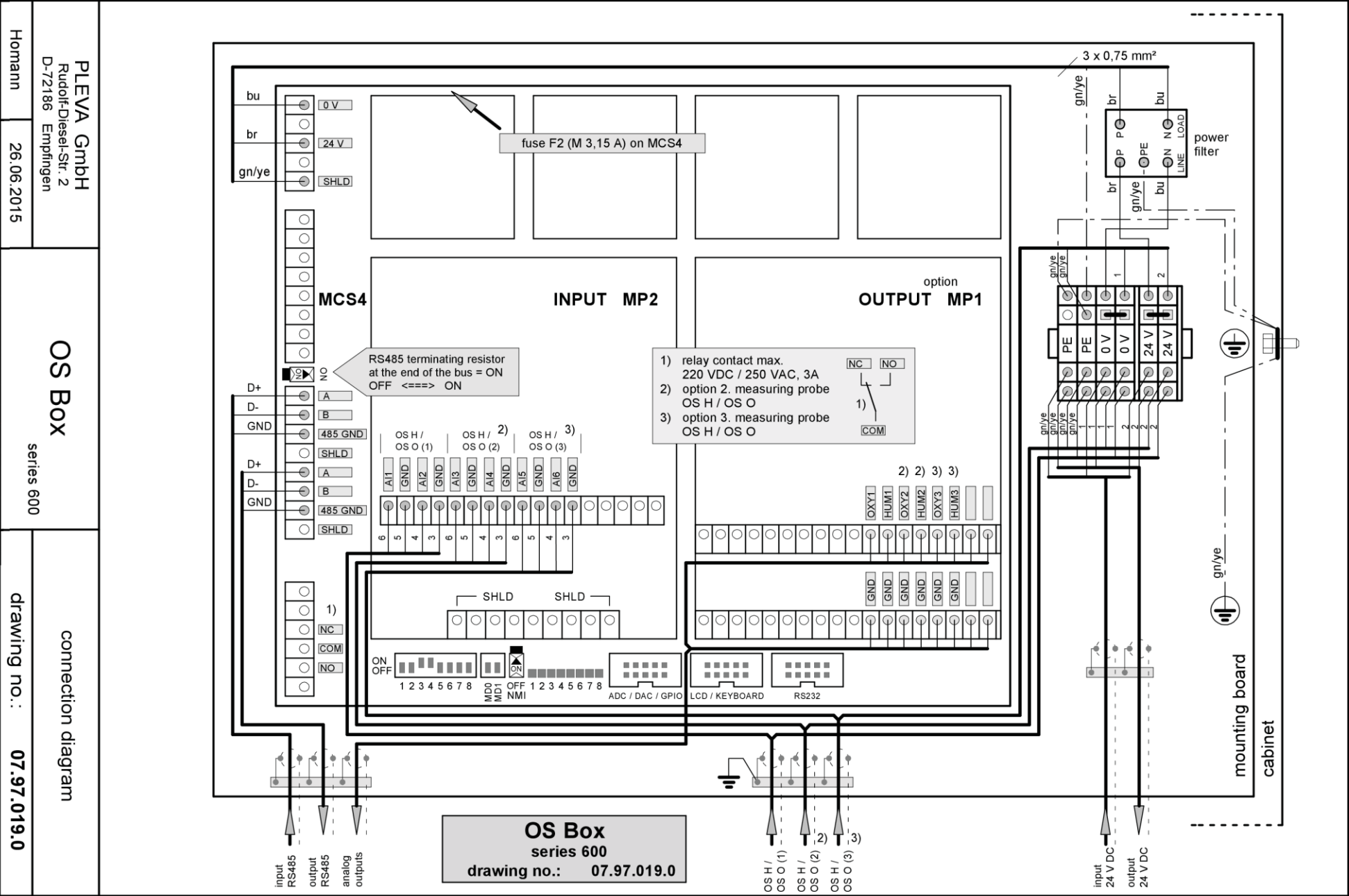


Eingang RS485
 input RS485
 Ausgang RS485
 output RS485
 Analogausgang
 analog output

FS X

Ausgang 24V DC
 output 24V DC
 Eingang 24V DC
 input 24V DC

Stück je Einheit: 1	Für Ø gilt die halbe Toleranz	Nennbereich	Über bis	0,5	6	30	100	400	1000	2000	
	Böhrung -	m (mittel)		± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2	
	Welle -	DIN ISO 2768									
Schutzvermerk nach DIN ISO 16016 beachten	Oberflächenbehandlung: pulverbesch.	Werkstoff:	1.0226-Z								
		Z.Nr.:	07.4.1.012.0								
		Ordnung	Stück	Name							
		Bestellnr.	06.8.0015	P. Büchtemeyer							
		Hersteller		OS BOX							
		Rev.		07.4.1.012.0_Kundenzeichnung							
				FS-X B							
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				PLEVA GmbH							
				Rudolf-Diesel-Str.2							
				D 72186 Empfingen							



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OS Box
series 600

connection diagram
drawing no.: 07.97.019.0

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drawing no.: 07.97.019.0

