# Lufft I-BOX

# Lufft I-BOX serial

**Measuring instruments gateway**



CE    (UMB)

www.lufft.com **Lufft**

**Lufft**

G. Lufft Mess- und Regeltechnik GmbH, Fellbach, Germany

## Contents

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# 1    Please read before use

## 1.1    Symbols used

⚠  Important information concerning hazards to the user

☞  Important information concerning the correct operation of the equipment

## 1.2    Safety Instructions

Installation and commissioning must be carried out by suitably qualified specialist personnel only.

Never take measurements on or touch live electrical parts.

Pay attention to the technical data and storage and operating conditions.

## 1.3    Designated Use

The equipment must only be operated within the range of the specified technical data.

The equipment must only be used under the conditions and for the purposes for which it was designed.

The safety and operation of the equipment can no longer be guaranteed if it is modified or adapted.

## 1.4    Incorrect Use

⚠  If the equipment is installed incorrectly:

- It may not function.
- It may be permanently damaged.
- Danger of injury may exist if the equipment is allowed to fall.

⚠  If the equipment is not connected correctly:

- It may not function.
- It may be permanently damaged.
- The possibility of an electrical shock may exist.

## 1.5    Guarantee

The guarantee period is 12 months from the date of delivery. The guarantee is forfeited if the designated use is violated.

## 1.6    Serial number

The serial number is shown besides the power supply connector  (EN=xxxx:xxxx:xxxx).

 "EN=" is not part of the serial number. The serial number ist displayed in the login screen, too.

## 1.7    Brand Names

All brand names referred to are subject without limitation to the valid trademark and ownership rights of the respective owner.

In this document "Lufft I-BOX" refers to the device family "Lufft I-BOX". Statements that refer to "Lufft I-BOX serial" are marked explicitly.

## 2    Scope of Delivery

Equipment: Lufft I-BOX / Lufft I-BOXserial*



Fig. 1: Top and front view

Ethernet cable 1 meter*



Fig. 2: Ethernet cable

Quickstart-Sheet*



Fig. 3: Quickstart manual

The operating manual is available as PDF file inside the Lufft I-BOX. After booting the Lufft I-BOX it can be downloaded from the footer.

* Pictures might be different to the original.

# 3   Order numbers and Support

| Part name | Order number | Website |
|---|---|---|
| Lufft I-BOX | 8200.00 | <br>http://www.lufft.com/en/products/produktsuche/?q=8200.00 |
| Lufft I-BOX serial | 8200.10 | <br>http://www.lufft.com/de/produkte/produktsuche/?q=8200.10 |

## 3.1   Accessories

| Part name | Order number | Website |
|---|---|---|
| Power Supply – Din Rail, 24V/DC/500mA | 8120.NT24 | <br>http://www.lufft.com/en/products/produktsuche/?q=8120.NT24 |

## 3.2   Support

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| Description | Website |
|---|---|
| Support-Site<br><br>For technical support, see section 15.1 | <br><br>http://lufft-i-box.com |

## 3.3 Lufft I-BOX App-Store

The Lufft I-BOX is expandable using Lufft I-BOX Apps. These Apps can be downloaded and purchased in the Lufft I-BOX App-Store.

| Part name | Website |
|---|---|
| Lufft I-BOX App-Store | <br><br>http://www.lufft-i-box.com/app/store |

# 4　Equipment Description

The Lufft I-BOX is a measuring instruments gateway. Using the Lufft I-BOX measuring values can be acquired from measuring instruments, buffered, sent actively (push) or delivered upon request (pull) in machine readable formats. The Lufft I-BOX is a flexible tool to integrate measurement instruments in enterprise networks and systems.

## 4.1　Lufft I-BOX Features

The Lufft I-BOX provides these features as shipped:

- Acquisition of measurement values from up to 30 devices, e.g. from the Lufft OPUS20 or WS family
- Caching and Buffering the last value per channel
- Providing a REST-API  for value delivery in JSON-format
- Range monitoring with email alerting features

The Lufft I-BOX can be enhanced using Lufft I-BOX Apps. These Apps can be downloaded and purchased in the Lufft I-BOX App-Store and installed through the User Interface.

## 4.2　Technical data

Network

- 10/100BaseT
- autosensing
- autocrossing

Connectivity

- 1 x LAN Network (RJ45)
- Screw terminals for power supply (when not connected via PoE)

LEDs / Button

- Multi-color-LED for system status display
- Network speed and data transfer
- Manual reset of device

Power supply

- Power-over-Ethernet (PoE)
- 24 ... 48V DC (+ / -10%) over screw terminals

Power Comsumption

- 60mA @ 24V
- 40mA @ 48V

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Temperatures / Humidity

- Row mounting: 0 ... 65°C
- Non-row mounting Montage: 0 ... 70°C
- 0 ... 90% rel. Humidity, non-condensing

Housing / Weight

- Plastic compact housing (105 x 75 x 22mm)
- Integrated DIN rail mount
- approx. 140g

# 5  Installation

## 5.1  Power Supply

The Lufft I-BOX can be powered either via PoE (Power over Ethernet) or from an external power supply.

### 5.1.1  PoE

The Lufft I-BOX is designed for use in PoE environments according to IEEE802.3af. Power is brought in here over the network infrastructure through the RJ45 terminal. The Lufft I-BOX supports both phantom power on data pairs 1/2 and 3/6 and power on the unused wire pairs 4/5 and 7/8.

To provide the supplied components with power management, the Lufft I-BOX identifies itself as a device in Power Class 2 (power consumption from 3.84W to 6.49W).

### 5.1.2  External power supply

Alternative to PoE the Lufft I-BOX can also be powered externally using the plug-in screw terminal on the underside of the housing. The DC voltage must be in a range of

24 ... 48V DC (+/-10%)

When applying the power please note the correct polarity. The 2-pin power plug is correspondingly labeled.

⚠ Reversing the polarity will not harm the hardware of the Lufft I-BOX

### 5.1.3  Disconnect from power supply

When disconnecting the Lufft I-BOX from the power supply, the operating system gets shut down controlled. The energy for this process is taken from two capacitors. Especially the file system is protected from failure, which could lead to problems at the next start of the system.

The capacitors are charged while operating the box.

## 5.2  Network connection

The Lufft I-BOX includes an IEEE 802.3 compatible network terminal. The physical connection is made using TP copper cable.

### 5.2.1  10/100BaseT on RJ45

The 10/100BaseT network interface uses a shielded RJ45 connector. The pin configuration and function corresponds to an Auto-MDI(X) interface. Connection to a hub, switch or other network device is made using a maxim 100m long shielded patch cable.

Because the send and receive lines on connected devices are automatically detected, use of any (straight and crossed) network cable is possible.

The network connection is galvanically isolated from the supply voltage for at least 500V.

The Lufft I-BOX uses autonegotiation. To prevent communication problems, caused for example by a duplex mismatch, we recommend operating the port on the switch or hub in this mode as well. Here both the transmission speed and the duplex procedure is automatically negotiated and correspondingly set in the devices.

⚠️ Managable switches often have special protocols (spanning tree protocol, port trunking, ...) as needed for example for uplinks to other switches or broadband connection of servers. These protocols are not generally needed for connecting normal terminal devices like the Lufft I-BOX, and they may significantly slow down the opening of a connection after a restart. We recommend disabling these protocols and functions on the port used for the Lufft I-BOX. Please consult your responsible network administrator.

## 5.3 LEDs

Optical indication of the network status is provided by the Lufft I-BOX in the form of two LEDs integrated into the RJ45 jack. The device status is displayed by a multi-color indicator also on the front of the unit.

### 5.3.1 Network status

Two LEDs in the lower corners of the RJ45 jack indicate the current network status of the Lufft I-BOX. The green LED may assume the following states:

- Off: No link
- On: Link present
- Flashing: Active data communication

The yellow LED indicates the current data rate:

- Off: 10MBit
- On: 100MBit

### 5.3.2 Multi-color indicator

The multi-color indicator on the front of the Lufft I-BOX is used to represent the current system status:

- Green: Normal state of the Lufft I-BOX. All services are started and the system is fully ready. An underlaid cyclical flashing indicates the system load. The faster this flashes, the greater the process load.
- Blue: Booting. All services are being booted up. At this time no connections to the Lufft I-BOX can be opened. When bootup is finished the LED changes shortly to red.
- .Blue flashing: Network traffic to or from the Lufft I-BOX.
- Red flashing (approx. 1Hz): No link
- Red, solid on: Serious system error. The system can no longer be properly started.

## 5.4    Button: Hardware-Reset

The mechanical button inegrated into the multi-color display can be used for manual triggering a hardware reset. When the button is held down the multi-color display changes from green to yellow to red. This process takes around 5 seconds. Then all connections are closed and the system is restarted.

After startup is complete the indicator comes on green again, including the underlaid pulsing which indicates the processor load.

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# 6    First Startup

When power supply is connected and on first startup, the Lufft I-BOX comes up with IP-Address 190.107.233.110. After the boot process is finished some system settings have to be adjusted to make the Lufft I-BOX productive.

The Setup Assistent guides through the most important system settings.

## 6.1    Setup-Assistant

During first system startup and successful logon the Setup Assistant is displayed.

After the Setup Assistant is finished it can be reactivated in the Settings->Common menu.

Fig. 4: Screenshot Setup-Assistant

The Setup Assistant allows to make settings for

- Language
- Administrator
- Network
- Date and time
- Email

For setting details see the following sections.

After the Setup Assistant ist finished and the system was rebooted, the system settings must be checked and adjusted on demand.

## 6.2    Network-Configuration

After the Lufft I-BOX is powered on, it must be provided with valid TCP/IP-Settings. Contact your network administrator for valid TCP/IP-settings.

The Lufft I-BOX initially comes up with the IP address 190.107.233.110.

In order to modify the network settings, the Lufft I-BOX and the PC have to be part of the same physical network. A direct link using a patch cable from Lufft I-BOX to the PC is also possible.

### 6.2.1    Managing network parameters

The Lufft I-BOX distinguishes between two modes with respect to its network-side basic parameters:

- Static.
- DHCP

As shipped static address assignment is enabled.

Switching between DHCP and static TCP/IP-Settings can be done in Settings->Network

#### 6.2.1.1    Static

The IP address, subnet mask and gateway are stored in the non-volatile setup of the Lufft I-BOX. The parameters set in this manner remain intact even after power interruptions and resets, until they are changed via web based user interface.

#### 6.2.1.2    DHCP

If automatic address assignment using DHCP is enabled, the Lufft I-BOX attempts to obtain its IP parameters from a DHCP server located in the network. If no DHCP server is in the network or if the attempt to obtain an IP address is rejected, the Lufft I-BOX operates using the factory default IP address 190.107.233.110. When switching from Static to DHCP mode, this default IP address is defaulted to until valid parameters are assigned.

### 6.2.2    Network name

To support an automatic update of the DNS system through the DHCP server, the Lufft I-BOX  identifies with a network name. The network name is set to "lufft-i-box".

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## 6.3   Common Settings



Fig. 5: Screenshot Common Settings

- System name
- System name (long)
- Notices: The Administrator can make any notices about the  Lufft I-BOX (e.g. purchasing date, support-contact, inventory number). Also the AcrtivationKeys for additionally installed Apps can be noted here.

## 6.4 Administrator Settings

The Administrator hast to manage frictionless production of the Lufft I-BOX. He gets Emails on critical log events.



Fig. 6: Screenshot Administrator Settings

- Email address: To this email, critical log events are being sent.
- Contact details: The contact details are shown on the prelogin screen. Thus any person without login credentials know whom to contact in case of system administration.

To successfully change a password, the current password has to be entered as well as the new password has to be confirmed.

If there is no input in the password-fields, the password is not changed on saving. The password requires at least 5 and maximum 20 characters.

## 6.5   Email-Settings

Emails are sent upon several events:

- Critical log entries
- Daily status report to the administrator (can be switched off)
- Whenever apps decide to send emails

To send emails, an email server is required. If there is no email server configured, no emails will be send at all.



Fig. 7: Screenshot Email Settings

## 6.6   Time and date

The System date and time can be set to the local time.

Date and time settings are battery buffered and do not reset during a power interruption.

# 7   User Interface

## 7.1   Dashboard / Home

The Dashboard is shown after successful login. Pressing the button "Home" (the little house icon) it can be reached throughout the Lufft I-BOX user interface.
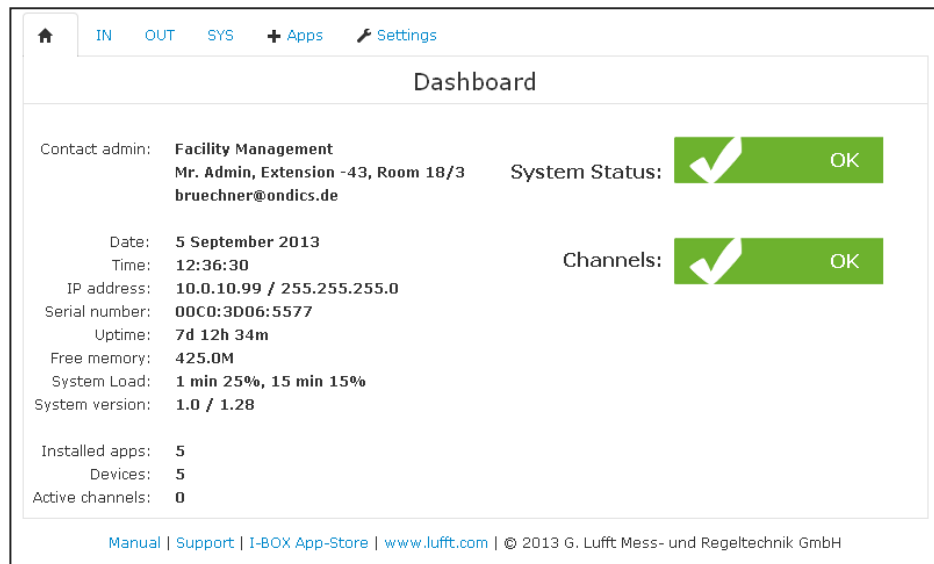


Fig. 8: Screenshot Dashboard / Home

The settings displayed in the dashboard are:

| | |
|---|---|
| Administrator | Contact details of the administrator (change in „Settings → Common") |
| Date / Time | current sytem daten & time (change in „Settings → Time") |
| IP-Address | Network settings (change in „Settings → Network") |
| Serial Number | Unique Serial Number of this Lufft I-BOX |
| Uptime | Period since last system boot (d=days, h=hours, m=minutes) |
| Free memory | Memory free for measuring purposes |
| System load | 1 minute and 15 minute average system load of Lufft I-BOX |
| Installed apps | Number of Apps installed in the Lufft I-BOX |
| Devices | Number of devices generated from Apps |
| Active channels | Number of channels configured and measured |

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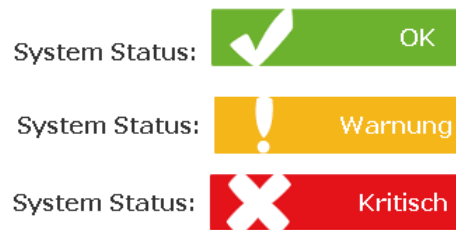The Lufft I-BOX system status is highlighted using colors:



Fig. 9: Dashboard display of system status

- Green: the Lufft I-BOX runs without critical errors or warnings
- Yellow: there are warnings logged
- Red: there are critical errors are in the log entries

The results of the channel monitoring are also highlighted using colors. However there are only two system states: ok and warning



Fig. 10: Dashboard display of range checks

- Green: there are no range exceedings
- Yellow: some channels are exceeing defined ranges

The log entries are shown by clicking on the icons.

## 7.2   Login-Screen

The login screen is displayed without being logged in. The contact details of the administrator are shown in case of maintenance or support requirements.



Fig. 11: Screenshot Login-Screen

Additionally there are shown:

| | |
|---|---|
| Admin email | Email address of the administrators |
| Admin contact | contact details of the administrator |
| System name | can be modified in "Settings → Common". The system name is also displayed in the header |
| Systemversion | Firmware version of the Lufft I-BOX |

## 7.3   Firmware update

Firmware updates change the fundamental behaviour of the Luff tI-BOX. For firmware updates you'll get specific instructions from Lufft on how to do such an update.

## 7.4   Backup

The backup process can be started in "Settings -> Backup/Restore" by hitting the button "Download the current backup".
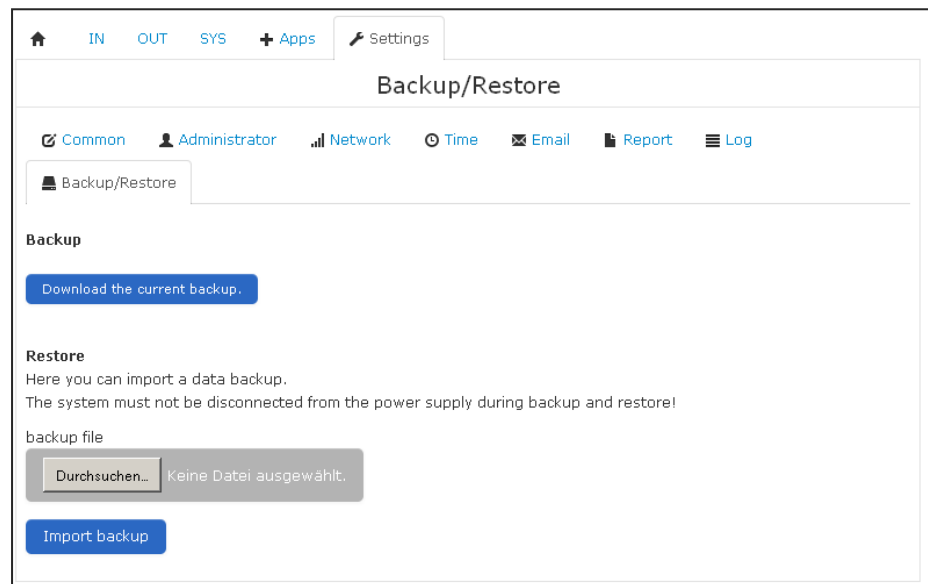


Fig. 12: Screenshot Backup/Restore

The backup process packs system files into a zip file:

- system configuration settings
- channel configurations and last channel values
- device configuration settings

A backup should be performed each time after system settings were heavily changed.

Apps that are downloaded from the lufft I-BOX App-Store and installed in the Lufft I-BOX are not part of the backup. These apps have to be reinstalled manually. For this reason, ActivationsKeys and the installation files of these apps have to be backuped separately.

## 7.5   Restore

Apps that have been installed before a backup was started have to be reinstalled to make the restore process succeeding.

To start the restore process, upload the backup file (zip) and then press the button "Import Backup".

All system settings are overridden during the restore process with anything but network settings.

Apps that are not compatible for the restore process (e.g. wrong version) show warnings during restore. However the restore process continues and finishes in a consistent state. Missing or incompatible apps can be installed and then a new restore process can be started. Every restore process should terminate without warnings and errors.

## 7.6    Password forgotten

The Lufft I-BOX can only be configured after successfully completing the login process. If the password is forgotten, there is a "Forgot your password?" feature with basic password recovery support.

Password recovery can be done in two ways

- If there is an email server configured, a new password is generated and sent to the configured administrator email address.
- If there is no email address and no email server configured, please contact our support team (see section 3). Please specify the Lufft I-BOX serial number (also printed onto the Lufft I-BOX).

# 8   Expanding the Lufft I-BOX with Apps

The Lufft I-BOX can be expanded with Lufft I-BOX Apps available at the Lufft I-BOX App-Store. Apps provide additional features to integrate the Lufft I-BOX into the Enterprise networks and applications you need. With apps, measurement tasks can be configured and adjusted quite flexible. Apps can be installed and deleted at any time.

## 8.1   Apps

Lufft I-BOX Apps are software modules that can be installed on the Lufft I-BOX and enrich the feature set of the Lufft I-BOX in any direction.

Apps have some advantages over well known industry software components:

- Apps expand the functional features of the Lufft i-BOX dynamically
- Apps can be installed during operation
- Apps can be reused for many devices

Apps within the Lufft I-BOX ecosystem can be of one of there types:

IN-Apps     Devices of IN-Apps acquire measured values from measuring instruments and save the value in the onboard Lufft I-BOX memory

SYS-Apps    Sys-Apps perform management tasks or special functions, e.g. to alarm, search, etc.

OUT-Apps    The measured values are delivered by OUT-Apps either in pull mode or in push-mode.

Selecting the tab "Apps" starts the App-Management center.
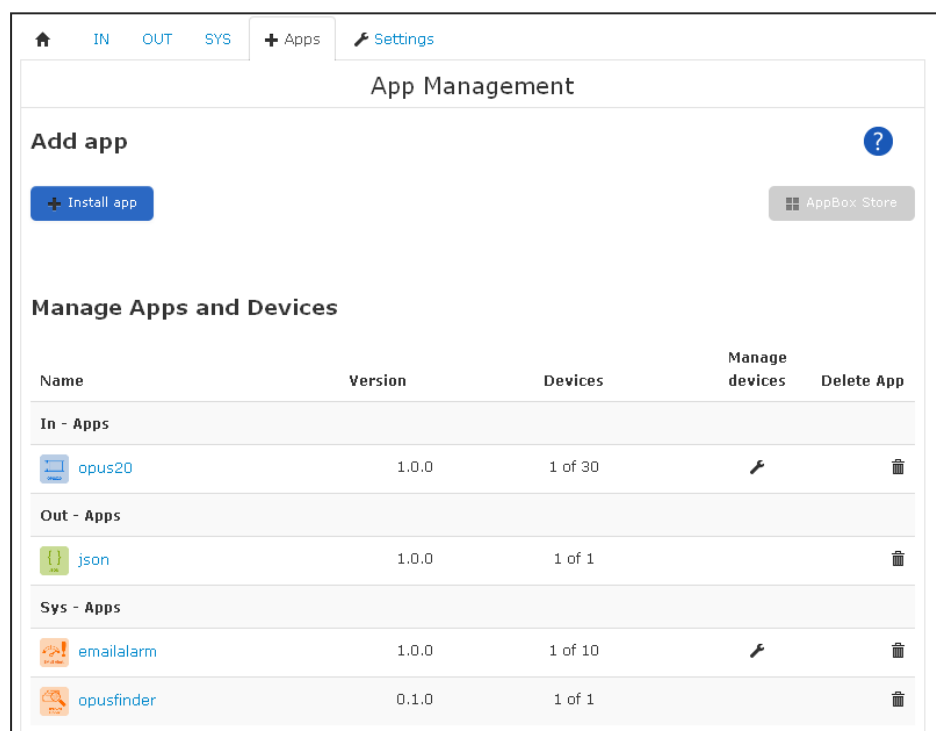


Fig. 13: Screenshot App Management

In the lower screen area all installed Lufft I-BOX Apps are shown. In the column "Manage devices" devices can be added, configured and deleted.

## 8.2 App lifecycle

The App lifecycle describes all stages of the app handling:

- find
- upoad/install
- make new device
- configure device
- update app
- deinstall app

### 8.2.1 Find and get new Apps

In the upper area of fig. 13 there are two options shown how to get new apps:

- Get apps from the Lufft I-BOX App-Store and install them manually (download to your local harddrive and install it via upload to the Lufft i-BOX)
- Get apps from the Lufft I-BOX App-Store fully automatically. With firmware 1.0.0 this feature is not yet available.

The Lufft I-BOX App-Store can be accessed via internet: http://lufft-i-box.com.

### 8.2.2 Technical information about apps

Every app is specified by the app developer using these features:

| Feature | Description |
|---|---|
| name | short name of the app |
| type | IN-App, OUT-App or SYS-App |
| description | brief description of the functional behavior |
| description URL | URL zur ausführlichen Beschreibung |
| licence name | name of licence |
| lizence URL | URL leading to details of licence |
| maximum devices | maximum number of devices to be created from this app |

### 8.2.3   Installation of apps

Within "Home → Apps → Management" new apps can be added / installed.

When installing apps manually, you get a zip file and have to perform a manual upload of this zip file.

Every apps needs to be activated before being installed. This can be done on http://lufft-i-box.com/app/activation. The serial number of the Lufft I-BOX and the AppKey are required to build an ActivationKey for an app.

After successful installation, the app is listed in "Home → Apps → Management"

### 8.2.4   Manage Devices

After installation an app has no function. To make it work, devices have to be generated out the app. Devices have specific configuration sets and can operate independently from each other.

For example a device of an OPUS20 IN-app can be configured to get values from one OPUS20 measuring instrument while another device of an OPUS20 IN-app get values from a different OPUS 20 instrument.

### 8.2.5   Device overview

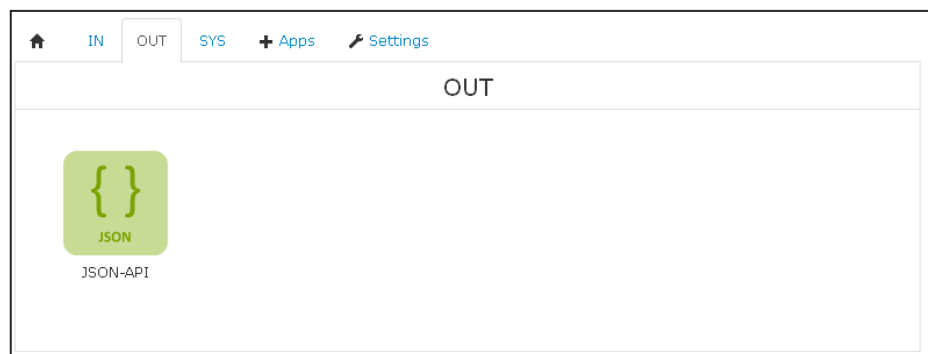The device types are listed as "IN", "OUT" and "SYS" tabs in the top menu.



Fig. 14: Screenshot OUT-Devices

When a device is selected, the device menu opens with at least the following tabs:

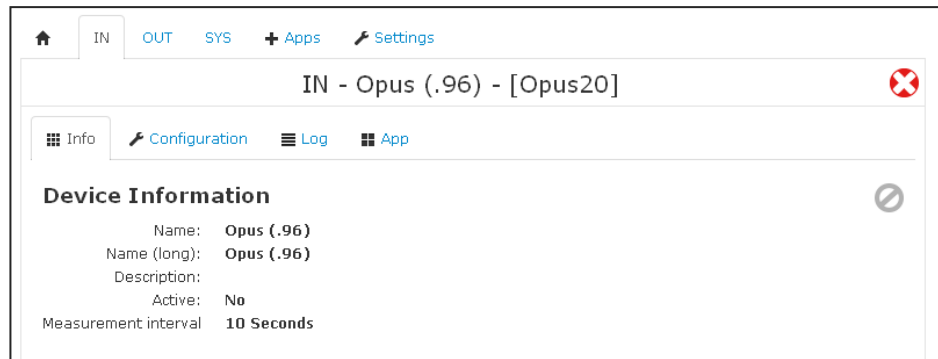|   |   |
|---|---|
| Info | Display of general information about app-configuration |
| Configuration | Configuration parameter to manage device operation |
| Log | All log entries of this device are shown. |
| App | Display of information about the app the device is generated from. |

Fig. 15: Screenshot IN-Device of OPUS20 app

### 8.2.6 App update

The apps are updated from time to time for various reasons. New features are introduced or bugs fixed. When a new app is released to the Lufft I-BOX App Store, it can be downloaded and installed to the Lufft i-BOX.

During the update process, the Lufft I-BOX checks if the update can be done during normal operation or if the configuration has to be modified.

Minor Updates can normally be done without reconfiguring the devices. Minor updates are updates with the first number of the version unchanged (e.g. 1.2.0 -> 1.3.0)

### 8.2.7 App deinstallation

When an app is deinstalled, all devices of this app are deinstalled, too. Configuration sets of these are deleted irrecoverable.

When deinstallation is started, there is a warning message if devices have to be deleted to avoid accidential deletion.

Any deinstalled app can be reinstalled again later. However, devices have to be generated and configured all new.

# 9    Preinstalled Apps

The Lufft I-BOX comes with preinstalled Apps. The Apps are described in the appendix.

More Apps can be downloaded from the App-Store.

## 9.1    Preinstalled Apps on Lufft I-BOX (Order number 8200.00)

The Lufft I-BOX comes with these Apps preinstalled:

- IN-App OPUS20
- SYS-App EmailAlarm
- SYS-App OPUS20Finder
- OUT-App JSON

## 9.2    Preinstalled Apps on Lufft I-BOX serial (Art.-Nr. 8200.10)

The Lufft I-BOX comes with these Apps preinstalled:

- IN-App WS
- SYS-App EmailAlarm
- OUT-App JSON

## 10  Declaration of Conformity

**Declaration of conformity according to directives 2004/108/EG (EMC), 2006/95/ EG (LVD) and 2011/65/EU (RoHS)**

G. Lufft Mess- und Regeltechnik GmbH, Fellbach/Germany, hereby confirms that the product

Lufft I-BOX measuring instruments gateway (order number: 8200.00)

Lufft I-BOX Messgeräte-Gateway (Bestell-Nr.: 8200.10)

fulfills the requirements of the directives / regulations specified below:

1. Emission according to

- EN 55022 Kl. B: 2010
- EN 61000-3-2: 2006 + A1, A2
- EN 61000-3-3: 2008

2. Noise Immunity according to EN 61000-6-2: 2005:

- EN 61000-4-2: 2009 ESD
- EN 61000-4-3: 2006 + A1, A2 Radiated Immunity
- EN 61000-4-4: 2004 + A1 Burst
- EN 61000-4-5: 2006 Surge
- EN 61000-4-6: 2009 Conducted Immunity
- EN 61000-4-8: 2010 H-Field
- EN 61000-4-11: 2004 Supply Voltage Dips and Interruptions

3. Product-specific Low-Voltage Directive for communications technology

With a supply voltage of maximum 48V DC (SELV), the above product does not fall under the application area of the Low Voltage Directive.

4. Restriction of the use of certain hazardous substances in electrical and electronic equipment

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

A copy of the signed Declaration of Conformity may be requested from G. Lufft Mess- und Regeltechnik GmbH and sent by regular mail or fax.

## 11  General errors

| Error description | Required action |
|---|---|
| The Lufft I-BOX cannot be connected via TCP/IP | - check power supply<br>- check Ethernet-connection<br>- check network settings |
| The Lufft I-BOX does not respond after configuration activities | A wrong ip-address was configured. See section 6.2 for recovery of the lufft I-BOX |
| Forgot your admin password | There are several password recovery mechanisms. Please see section 7.6 for password recovery. |

Need more help? Please see section 3.2 for more support options.

## 12  Repair / Corrective Maintenance

Please arrange for any faulty equipment to be checked and, if necessary, repaired by the manufacturer exclusively. Do not open the equipment and do not under any circumstances attempt to carry out your own repairs.

In matters of guarantee or repair please contact:

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70736 Fellbach

Postfach 4252
70719 Fellbach
Germany

Tel: +49 711 51822-0
Hotline: +49 711 51822-52
Fax: +49 711 51822-41

E-Mail: info@lufft.de

or your local distributor.

### 12.1  Technical Support

Our Hotline is available for technical questions via the following e-mail address:

support@lufft.de

You can also consult frequently asked questions at http://www.lufft.com or visit the Lufft I-BOX support site at http://lufft-i-box.com

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