Appendix

1 The App „WS serial“

The app “WS serial” transmits values from Lufft WS compact weather stations to the Lufft I-BOX. It is shipped with the Lufft I-BOX serial and can be used out of the box.

1.1 Operating mode

The app “WS serial” acquires values from Lufft WS compact weather stations. The last acquired value per channel will be saved in the Lufft I-BOX serial.

The app supports all devices of the Lufft WS family:

- WS200-UMB 8371.U01
- WS300-UMB 8372.U01
- WS301-UMB 8374.U01
- WS302-UMB 8374.U10
- WS303-UMB 8374.U11
- WS304-UMB 8374.U12
- WS310-UMB 8374.U13
- WS400-UMB 8369.U01 (Europa, USA, Kanada)
- WS401-UMB 8377.U01
- WS500-UMB 8373.U01
- WS501-UMB 8375.U01
- WS502-UMB 8375.U10
- WS503-UMB 8375.U11
- WS504-UMB 8375.U12
- WS510-UMB 8375.U13
- WS600-UMB 8370.U01 (Europa, USA, Kanada)
- WS601-UMB 8376.U01
- WS700-UMB 8380.U01 (Europa, USA, Kanada)

These weather stations are connected to the Lufft I-BOX serial via serial link.

To connect a WS compact weather station to the Lufft I-BOX serial a UMB Interface converter ISOCON-UMB (Lufft order number ISOCON-UMB) is required.

All channels of WS devices are supported. External sensors connected to a WS device are supported as well.

1.2 Features

feature	description
name	WS serial
type	IN
description	This app acquires live values from Lufft WS compact weather stations family (see microsite http://www.ws600.info or product

	website http://www.lufft.com/de/produkte/produktsuche/?q=ws). All channels are loaded on request. External sensors are supported.
description URL	http://lufft-i-box.com/app/view?name=wsserial
licence name	Ondics Lufft I-BOX App EULA
lizence URL	http://lufft-i-box.com/dev/ondics/eula.html
maximum devices	1

1.3 Configuration

After generating an WS serial device from an app, it can be configured. In the “Info” tab there the firmware information of the connected WS serial compact weather station is shown. To configure the WS serial device, go to the “Configuration” tab.

The configuration parameters are:

name (short)	Name of the device for display in the device list.
name (long)	A longer name for the device.
description	Notes for the device configuration, location and other information, e.g. measuring tasks involved
device active	Switches on or off the value acquisition inside the lufft I-BOX
measurement interval	Interval between subsequent measurement value acquisitions
WS-ID	ID of the WS compact weather station to communicate over the serial interface (Slave-ID)
Master-ID	ID of the Lufft I-BOX serial. Defaults to 1 and should be changed if multiple WS weather stations are connected
Baudrate	The baud rate 19.200 is the recommended baud rate from manufacturer Lufft when connecting a WS compact weather station. The default setting of the ISOCON connection module is 19.200 baud, too.

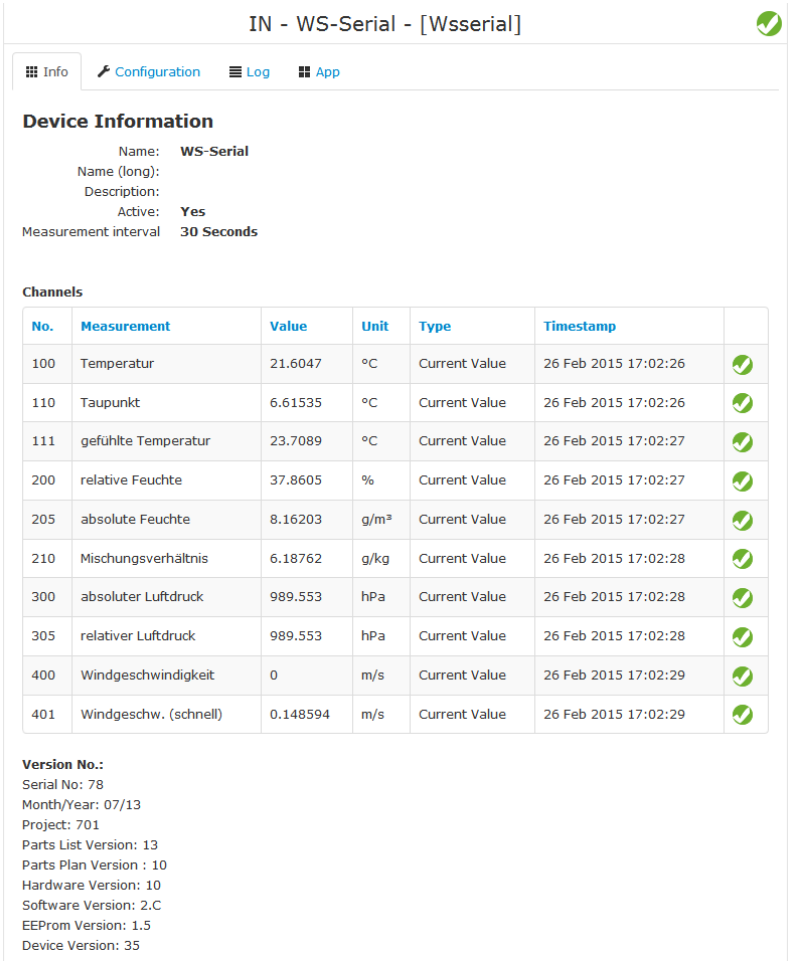

Fig. 1: Screenshot WS serial device Information tab

Within the sub-tab “channels” the channels can be configured. The button “get channels” requests and displays the channel list (internal channels and channels of external sensors connected) from the WS weather station. If there were already configured active channels, they are displayed with checked a checkbox. Using the checkboxes the channel list in the Lufft I-BOX serial can be modified.

For each channel a name can be specified by clicking on the value displayed in the “Caption” columns.

1.4 Logging / errors

During WS serial device operation, several warnings or errors may happen. They will get logged in the “log” tab.

log type	Description (e.g.)	action required
Serial_-2	error on serial link connection layer	- check cable
UMBFrame	frame checksum error	- check UMB device. No WS weather station?
Status_82	measurement out of range	- Too hot or too cold for WS device. Check positioning of WS device

Those log entries are warnings and not critical, if not persistent.

During operation, if warnings occur, values cannot be acquired and stored in the Lufft I-BOX serial correctly.

2 The App „JSON“

The app “JSON” provides a REST API to the Lufft I-BOX. It is shipped with the Lufft I-BOX. It can be used out of the box.

The JSON data format is a very simple machine readable data format. There are many programming languages and enterprise systems supporting JSON today. Using JSON you can realize quite simple measuring data transmission and measuring data request solutions.

JSON is a fundamental data format for many Internet of Things (IoT) .applications.

For general information about REST APIs (REST = Representational State Transfer) and about the data format JSON (JSON = JavaScript Object Notation) please refer to Wikipedia (see http://en.wikipedia.org/wiki/Representational_State_Transfer and http://en.wikipedia.org/wiki/JSON).

2.1 Operating mode

The App is an OUT app and delivers information on demand. The client sends http GET requests and gets results in JSON format.

The app supports

- measured live values that are stored inside the Lufft I-BOX
- delivering a channel list with all channels measured
- meta-data about channels
-

2.2 Features

feature	description
name	JSON
type	OUT
description	This app provides a REST API (Application Programming Interface). Upon http-GET- requests, this app delivers a channel list with meta data, single or multiple value data.
description URL	http://lufft-i-box.com/app/view?name=json
licence name	Ondics Lufft I-BOX App EULA
lizence URL	http://lufft-i-box.com/dev/ondics/eula.html
maximum devices	1

2.3 API specification

2.3.1 Request specification

Each request is sent as a http-GET command.

```
http://<lufft-i-box-address>/
websites/ab/index.php/json/<devid>/api/<command>
```

<lufft-i-box-address>	network name or IP-address of the Lufft I-BOX
<devid>	Device ID as shown in API help page
<command>	for specified commands refer to next section

In the next section, the first part of the request:

http://<lufft-i-box-address>/websites/ab/index.php/json/<devid>/api/

is named as <Base-URL>.

2.3.2 Response specification

All responses are in JSON format. For detailed JSON specification please refer to RFC 4627 (http://www.ietf.org/rfc/rfc4627.txt).

The responses in JSON fomat are coded with the UTF8 character set.

2.3.3 Response errors

All requests have a „success“ field. Successful requests set this field to “true”, errors are indicated with “false”. In case of an error, there are two additional fields: „errorno“ und „errormsg“.

Response examples:

```
{ "success": „false",
  „errno": „01" ,
  „errormsg":"required fields missing",
}
```

```
{ "success": „true", ... }
```

2.4 API commands

2.4.1 Channel overview

Name	getchannels
description	returns a list of all active channels
URL	<Base-URL>/getchannels
parameter	-
response	success... „true“ on success, there are: channel... list of channels channelmetaid... internal channel id (Integer) app… name of app

	deviceid… device-ID devicecaption… configured description of device (string) channelno… channel number (device specific) interval… measuring intervall (multiplied by 10, in seconds) Integer type… channel type (see below) caption… channel caption (string, max. 255 chars) measurementname… measurement name (string, max. 255 chars) unitname… measurement unit (String) valuemin… lower range min valuemax… upper range max

The channel type can be one of these

- 16: current value
- 17: minimum value
- 18: maximum value
- 19: average
- 20: sum
- 21: vectorized average

2.4.2 Value request

name	getvalues
description	Returns one or more values
URL	`<Base-URL>/getvalues?valueids=<dev-ch>,...`
parameter	`<dev-ch>` Unique channel ID. Concatenated field out of device-ID, a dash "-" character, and channel number (see command getchannels). This parameter can repeated comma separated in order to get multiple values Example for a valid request: `<Base-URL>/getvalues?valueids=4-1,5-1,6-2`
response	success „true"…on success, there are: values list of live values: channelid... ID of channel (String) errortype.. error type for this value (String) (if empty, no error) errorno... error number (0 = no error) value.. last measured value (float) timestamp.. date and time of value acquisition from measuring instrument. format: YYYY-MM-DD H:M:S (String)

2.5 Configuration

To configure the JSON API device, go to the “Configuration” tab. The configuration parameters are:

name (short)	Name of the device for display in the device list.
name (long)	A longer name for the device.
description	Notes about the device usage / configuration
device active	Switches on or off the API feature

If the device is switched off, a success = false is returned.

2.6 Logging / errors

While the JSON device is active, there can be log entries:

log type	Description (e.g.)	action required
Request	Error in URL request	- check URL parameters

These log entries are not critical.

2.7 Beispiele von JSON-Abfragen

The command getchannels returns with thie JSON string (example konfiguration):

http://<lufft-i-box>/websites/ab/index.php/json/1/api/getchannels


```
{
   "success":true,
   "channels":[
      {
         "channelmetaid":"478",
         "valueid":"110-40105",
         "app":"wsserial",
         "deviceid":"110",
         "devicecaption":"WS",
         "channelno":"40105",
         "interval":"1",
         "type":"16",
         "caption":"",
         "measurementname":"Temperatur",
         "unitname":"\u00b0F",
         "valuemin":"-40",
         "valuemax":"80"
      },
      {
         "channelmetaid":"479",
         "valueid":"110-40115",
         "app":"wsserial",
```

```
            "deviceid":"110",
            "devicecaption":"WS",
            "channelno":"40115",
            "interval":"1",
            "type":"16",
            "caption":"",
            "measurementname":"Taupunkt",
            "unitname":"\u00b0F",
            "valuemin":"-40",
            "valuemax":"80"
         }
      ],
      "errorno":0,
      "errormsg":""
   }
```


The command getvalues returns with thie JSON string (example konfiguration):

http://<lufft-i-box>/websites/ab/index.php/json/1/api/getvalues?valueids=73-100,73-120


```
{
   "success":true,
   "values":[
      {
         "success":false,
         "id":"73-100",
         "value":0,
         "timestamp":"2013-11-27 10:35:26",
         "errorno":0,
         "errortype":""
      },
      {
         "success":false,
         "id":"73-120",
         "value":0,
         "timestamp":"2013-11-27 10:35:26",
         "errorno":0,
         "errortype":""
      }
   ]
}
```

3 The App „Email Alert“

The app “Email Alert” monitors channel values and alerts if ranges are exceeded.

It is shipped with the Lufft I-BOX. It can be used out of the box.

3.1 Operating mode

The App „Email Alert“ checks configured channels in specified intervals:

- range check if lower limit is underrun
- range check if upper limit is overrun
- send an email to specified email addresses when ranges are exceeded

3.2 Features

feature	description
name	E-Mail Alert
type	SYS
description	This app checks if channel values are in the specified range. Ranges can be set per channel. If a value is out of range, an email is sent.
description URL	http://lufft-i-box.com/app/view?name=emailalarm
licence name	Ondics Lufft I-BOX App EULA
lizence URL	http://lufft-i-box.com/dev/ondics/eula.html
maximum devices	10

3.3 Configuration

To configure an “Email Alert” device, go to the “Configuration” tab. The configuration parameters are:

name (short)	Name of the device for display in the device list.
name (long)	A longer name for the device.
description	Notes about the device usage / configuration (e.g. measurement task monitored, duration of monitoring)
device active	Switches the value acquisition on or off inside the lufft I-BOX
interval	Interval when the range check is performed
email adress	One or more email addresses can be specified (comma separated)

In the tab “channels” all channels of the Lufft I-BOX to be monitored can be specified. A channel is only monitored, if an upper range, a lower range or both are specified.

3.4 Logging / errors

During “Email Alert” device operation if ranges are exceeded, “info” log entries are generated. They will get logged in the “log” tab.

If an email could not be sent (server down, email address incorrect), a warning is logged.

All info log entries are shown colored on the dashboard, too:

- green: checks were performed, no ranges were exceeded – no alarms
- yellow: checks were performed, ranges habe been exceeded –alarm emails were sent