Drying cabinet TSS.../TS2011v2

Operating instructions

Application

The drying cabinet can be used for drying and storage of different types of parts, assemblies, materials in the form of powders and granules.
In principle, it can be dried and stored everything, except:
Excluded are parts and materials in which the outgassing flammable gases. (EXPLOSION HAZARD)

Features

The drying cabinet consists essentially of the following components:
Metal cabinet with **external Drying unit** consisting of:
Zeolite, heating, turbine, control valves, humidity sensors and the electronic control with a display.

USB port for configuration software, diagnostic information and functions, firmware update, sending bug reports by email for support.

LAN port for the web interface, display the current moisture in the cabinet, the operating mode and status, diagnostic information and functions, MPFS update.

For PC Software or (Linux for Raspberry PI) for Data logging of moisture, display and output.

For parts management with monitoring of Drying sign of humidity for monitoring the component moisture for release for Placement.

Delivery drying cabinet TSS../TS2011

- Drying cabinet TSS2011
- USB cable

- Drying cabinet TS2011
- 4 Shelf boards
- USB cable

Intended Use

Use the device only in accordance with the specifications described in the application. Any other use is considered improper and may result in property damage or even personal injury.
The manufacturer accepts no liability for damage caused by improper use.

Safety instructions

The unit was designed for a mains voltage of 230V 50/60 Hz.

Don't use the device if the housing or the power cord is defective or shows any other visible damage.

If the power cord is damaged, have it replaced by the manufacturer or by a qualified person in order to avoid a hazard.

If the unit emits smoke, burnt smells or is making an unusual noise, immediately unplug the power cord. If you can not resolve the problem, don't take the unit into operation again.

The device complies with protection class I and must be connected to a socket with the properly installed earthing conductor.

Interventions and repairs to the appliance must be carried out by authorized persons.
Unauthorised repairs result in loss of warranty and guarantee claims.

Never plug objects through the ventilation slots in the cover.

Use the device only indoors.

Clean the device and the interior with a damp cloth.

Danger of burns !!
During regeneration of the drying unit comes laterally out of the ventilation shaft extremely hot air (to 160 ° C).
Do not place flammable objects in this area and keeping adequate distance.

Does not dry solvent-based parts.
DANGER OF EXPLOSION

Mounting and Alignment

Positioning the unit to the desired location.
With the leveling feet align the device so that it is in level and that the doors can be easily opened / closed.

Make sure that the vents of the drying unit are not covered (At least 5 cm distance).

Commissioning

For commissioning, plug the power cord into a 230 V grounded outlet.
The unit has no power switch and therefore operates immediately.
The program starts with a check for: display, electronics, valves and turbine.
Whether subsequently the program drying or regeneration is started, it's depending on the degree of saturation of the zeolite.
The display shows the relative humidity (xx.x), which enters on the top of the cabinet, resp. exiting the cabinet below. In case of an error (Fxx) appears.
Regeneration is represented by   `- - -`
Door open is represented by   `[ - ]`
Close the door is represented by   `| - |`
When the time for door open is exceeded, a buzzer indicating please close the cabinet door.

Dry

During drying the cabinet operates in a circulating air operation, i.e. dry air is blown up into the cabinet, these flows downward, is sucked there and passed through the drying cartridge with the zeolite.
The air is removed from the moisture, its dry and re-introduced up into the cabinet. That means that the air in the cabinet is circulated constant.
In this process, the zeolite of the drying cartridge accumulates more and more water and the relative humidity of above injected air rises.
When the preset value of the relative humidity of the air blown at the top in the monitor program is reached, the regeneration of the drying cartridge is initiated.

Regenerate

During regeneration the valves are closed for the cabinet, that is at this time the cabinet is not flooded with dry air.

Regeneration takes about 1.5 hours.
Depending on the load and doorway intervals the cabinet is ready to dry for 1..4 days before it has to be regenerated again.
If the moisture content of the above-blown air into the cabinet exceeds the in the monitor program adjustable value in humidity of 3 ... 10%, then the recovery operation is started again.
The zeolite can be regenerated without losses indefinitely.

Data interface = USB / LAN jack
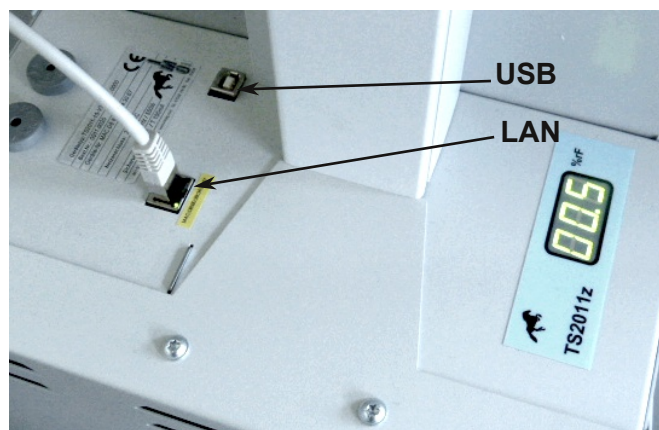
Energy balance

After regeneration, the humidity of the air blown into the cabinet is almost 0% RH.
This value is held to about 80% saturation of the zeolite and increases slowly then.
The cartridge contains 2.7 liters zeolite.
The zeolite can absorb about 350 g of water before it needs to be regenerated.
The absolute humidity (at 25 ° C and 60% rel. F.) is at about 15g water / m³ air. This corresponds to approximately 23m³ air.
Depending on the load of the cabinet and number of openings of doors, drawers, can be expected until the next regeneration with 1 ... 5 days.
For the duration of the regeneration of 1.5h is the power consumption 570 W.
During drying, the power consumption is approximately 30W.
If we count with 0.2 € per KWh, so the cost of electricity for the drying cabinet TS2011 will be about 30kWh x 0,2 € / KWh = 6 € / month. This indicates that the dry storage is the most effective way and also very inexpensive.

Error messages

The dry cabinet is equipped with a comprehensive error detection management. The following errors are recognized:

F01: Mains Frequency Monitoring
F02: I²C Bus error
F03: RTC error / clock not found
F04: safety relay is not interrupted.
F11: humidity sensor above does not respond.
F12: humidity sensor below does not respond.
F13: temperature sensor missing above.
F14: temperature sensor missing below.
F18: humidity value above is within 255min not less than 10% RH declined.
F24: Regeneration cartridge Valve Top Rear control, temperature of upper humidity sensor> 55 ° C.
F26: Temperature of the humidity sensor above> 88 ° C.
F30: no turbine speed signal
Check turbine or photocell.
F32: turbine rotates too quickly> 300 1 / sec control circuit or faulty triac
F34: power is too high for the turbine.
Turbine used / defective

F40 TICK INIT
F41 FS INIT
F42 READ CONFIG
F43 STACK INIT
F44 FRAM ERROR
F45 FLASH ERROR

F50: Temperature during regeneration above 300 °, check turbine or VTF
F52. The temperature of the heating had not achieved 100°C after 5 minutes
Check heating or relay
F54. The temperature of the heater is dropped of less than 150°C during the regeneration.
Check heating or relay
F56: Regeneration takes longer than 240min.
F57: The Main routine is not working properly.

Start phase program

01 General Start
02 Init I2C
03 error ????
04 Tick Init
05 MPFS Init
06 App Config
07 Stack Init
08 Hardware Init OK so far.

Technical specifications
Changes in the interest of progress.

Manufacturer	IMO GmbH
Type designation	TSS ... / TS 2011
Power Supply	230V 50..60Hz
Power at dry	30W
Power at regenerating	550W
Time for regenerating about	1.5 h
Yearly energy consumption about	360KWh
Sound	45 ... 55 dBA

TS 2011
Dimensions: 198 x (92 + 17) x 61 cm H x W x D
Color: light gray similar. RAL7035
4 shelves per cabinet, each (50 kg capacity)
Weight: 102 Kg

TSS2011
Dimensions: 145 x (93 + 17) x 74 cm H x W x D
5 drawer 84 x 70 x 19,5 / 34,5 cm W x D x H
Max. Load per drawer 45 kg
Colour: RAL 7035, powder-coated,
electrically dissipative
Weight: 153 Kg

Monitor program

With our monitoring program, you have the ability to change the configuration file to store the moisture data of the cabinet and to visualize.

Installing the Monitor program

Download the setup.exe program from our Homepage- Download on your computer and start the installation.
Now follow the instructions.
Thus, the monitor program will be installed with the associated drivers on your computer.
Now all important and relevant data of the cabinet are cyclically stored in a database on your computer.
Now in the taskbar right our logo appears.
The colors of the horse mean:

Yellow- not loged.
Light green- data are fetched.
Dark green- everything o.k.
Red - error !! Check event list in DB Config.

Clicking on the horse, it opens the datalogger.
Go to network. If not already present, select the IP number of their network and click search cabinet (Schranksuche). If your cabinet is connected to the network, then the IP number and the MAC Adr of the cabinet appears. The cabinet is automatically added to the data logger. Under Logger you can select cabinets.
By rebooting the PC database is also started.

Now open the Monitor program TS2011_15 which is located on your desktop.
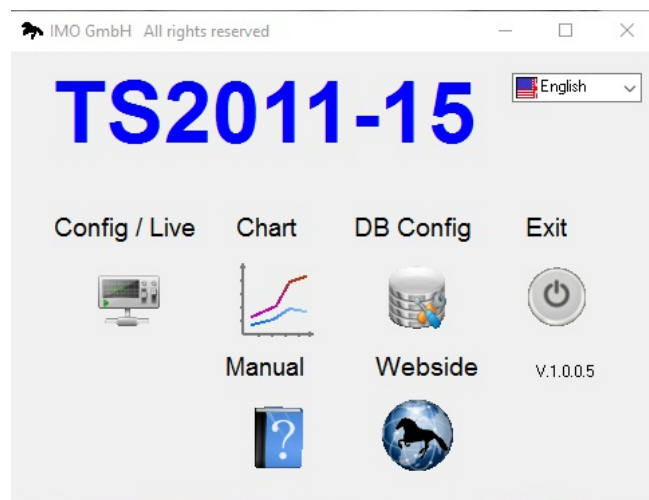
In **Config / Live** can be set via USB interface the parameters for the cabinet.

In **DB Config** placing to the cabinet with the associated MAC address a name of your choice. Here can also be specified the LOG interval.

In the **Chart** you see the logged data for the cabinet for moisture. There are also various options for data output.

Explanation of Config Live

To work with Config Live, the USB interface of the cabinet have to be connected with the computer.
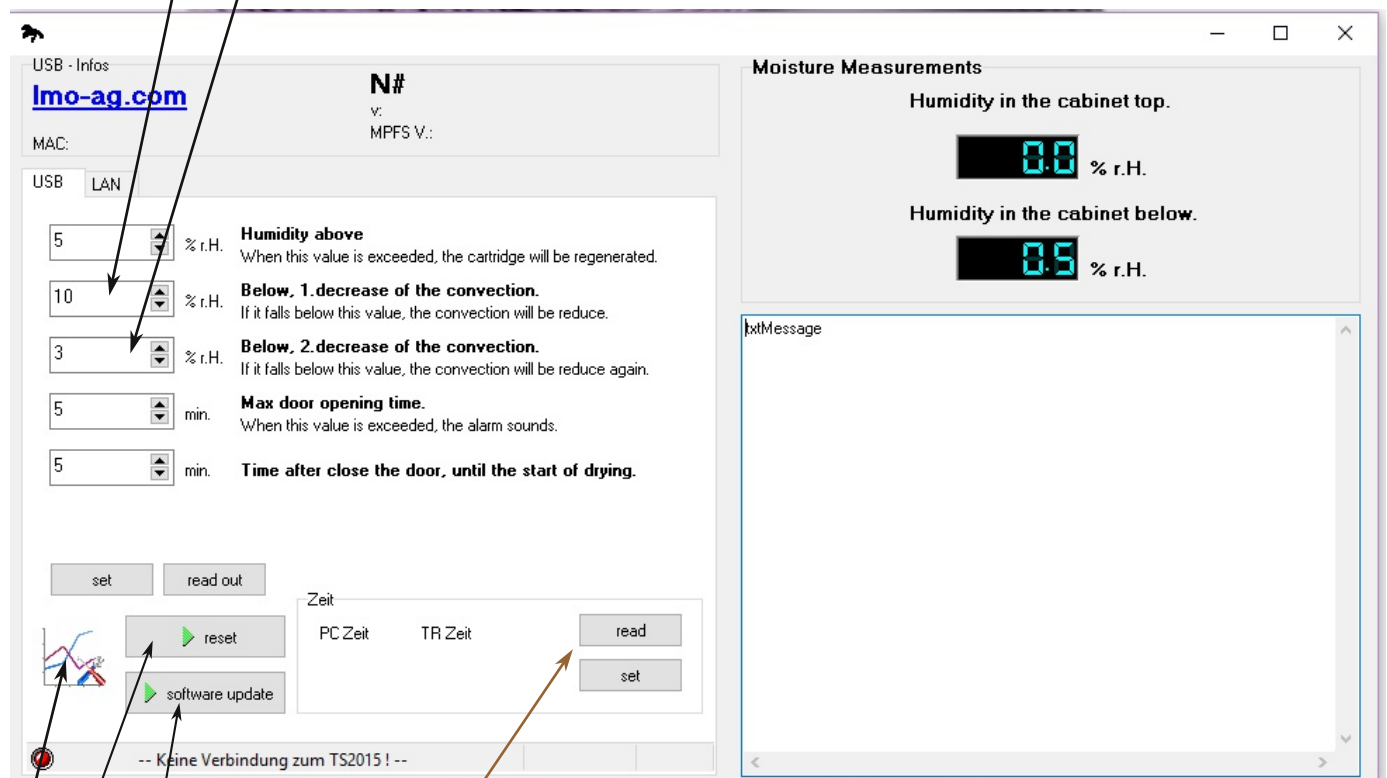
Cabinet specifications

This is for the noise and energy reduction. It becomes active when after closing the door, the humidity value is fallen below, which is set here.

Setting cabinet specifications

Setting values for SMD components as ICs, etc.

Humidity above   5%
1. Reduction   8%
2. Reduction   5%

These values can be adjusted individually.

USB - Infos
lmo-ag.com
MAC:

N#
v:
MPFS V.:

USB LAN

5 ▲▼ % r.H. **Humidity above**
When this value is exceeded, the cartridge will be regenerated.

10 ▲▼ % r.H. **Below, 1.decrease of the convection.**
If it falls below this value, the convection will be reduce.

3 ▲▼ % r.H. **Below, 2.decrease of the convection.**
If it falls below this value, the convection will be reduce again.

5 ▲▼ min. **Max door opening time.**
When this value is exceeded, the alarm sounds.

5 ▲▼ min. **Time after close the door, until the start of drying.**

set   read out

▶ reset
▶ software update

Zeit
PC Zeit   TR Zeit   read
set

-- Keine Verbindung zum TS2015 ! --

Moisture Measurements
Humidity in the cabinet top.
0.0 % r.H.
Humidity in the cabinet below.
0.5 % r.H.

txtMessage

Serves only for the analysis of errors, here you can then check the individual values.

With the reset button the cabinet will be restarted.

This button is used for uploading updates of software.

This is to be equated with power off-on.

Setting the hardware clock of the cabinet.

If you enter in your browser the IP number of her cabinet, then opens it the **WEB** surface of the cabinet.

Humidity sensor above
26.4 °C
0 %rF

Valves above

MPFS Upload
Status: 2818
Countdowntime: 0
OK Timer: 300

☑ Motorstart
☑ Sicherheitsrel.
☐ Heizung
☐ Summer
☐ Tür
☐ Tür2
☑ I2C Ok
☐ Button Pressed

Reset

FW-Update

Program flow
Fehler: 0
Programm: 4 Trocknung
Abschnitt: 4
HYT oben : 0
HYT unten : 0
Netzfreq.: 50

Temperature sensor, top
32 °C

Ventiltest:1

Zeolite cartridge

Zeolite filling 2.7 liters

Temperature sensor, below
34 °C

Humidity sensor below
23 °C
0.3 %rF

Turbine
Drehzahl: 33 RPs

Valve below