Entwicklung Hard- + Software

O2- Kompmaster II

Composting Control Unit

In cooperation with: UTV AG

For more information, see **http://www.komposttechnik.de** **Document Rev. 1.0 20.05.2014**

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1 Introduction

The “Kompmaster” composting control unit from EHS is designed to control and log the composting process by means of connected temperature, oxygen and pressure measuring sensors. Only measuring sensors authorized by EHS for operation with the composting control unit must be connected to the control unit.
An integrated and buffered memory records and stores the data relevant to the assessment of the composting process, until they are read and saved, which can be done using the “Kompmaster” software for PCs provided.
It is recommended that you download the data in regular intervals and that you generate and archive backup copies of your data.

2 Description

The “Kompmaster” control unit is used to control the compost decomposition and to log the temperature values and the oxygen content. The control unit is designed for both stand-alone and networked operation with maximum 32 control units.
In stand-alone operation, the connection to the control PC is achieved by means of an
In networked operation, the connection to the control PC is achieved by means of an RS485 interface, which requires the use of corresponding interface converters.
With the PC software provided it is possible to monitor the composting process during running operation, allowing control of the composting process at any time. With the help of the PC software you can also configure the settings and carry out the setup of the composting control units connected.
For a detailed description of the software, please see the manual provided.
In networked operation, the current measured values of all connected and active control units are displayed on the PC. The settings and the control unit setup required can also be carried out directly for all active control units using the PC software.
Once they are initialized, both units work “stand-alone” without the PC. The PC is only required for programming and to archive and evaluate the data.

3 Connector Configuration

The connectors on the side of the control unit are configured as follows.

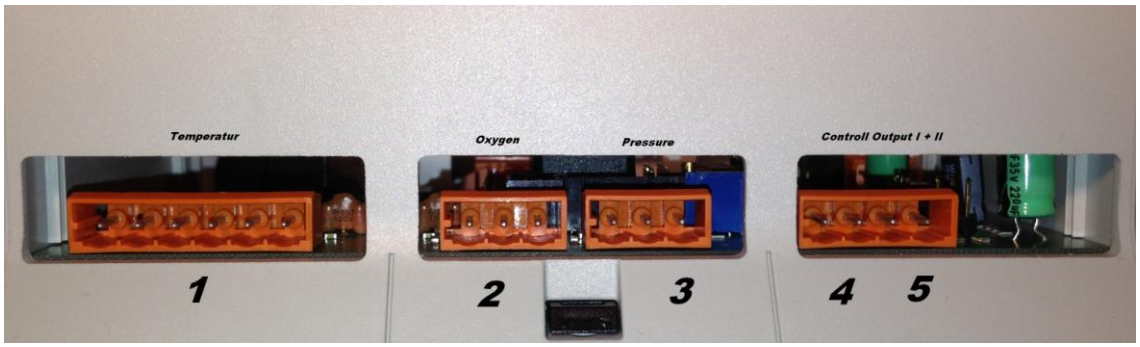


Figure 1: Connector Configuration Frontpanel

(1) Temperature sensor
(2) Oxygen sensor
(3) Pressure sensor
(4) Control output I
(5) Control output II
(6) Power Supply
(7) Fuse Sensor
(8) RS 485 Connection
(9) Adress Switch

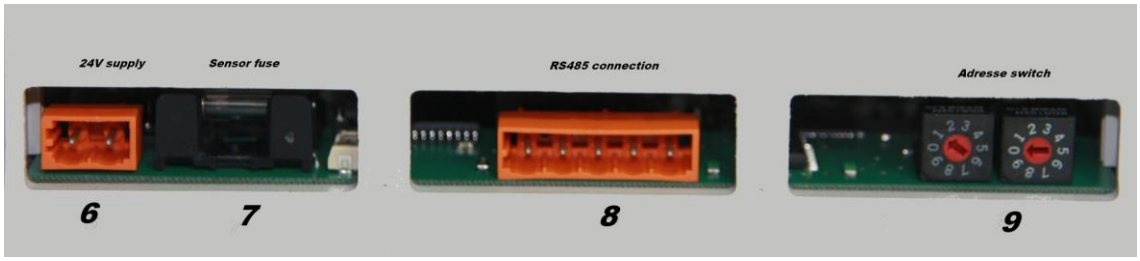


Figure 2: Connector Configuration Rearpanel.

Please observe the configuration. Wrong connections can result in damage to the control unit.

3.1 Supply Pin Configuration

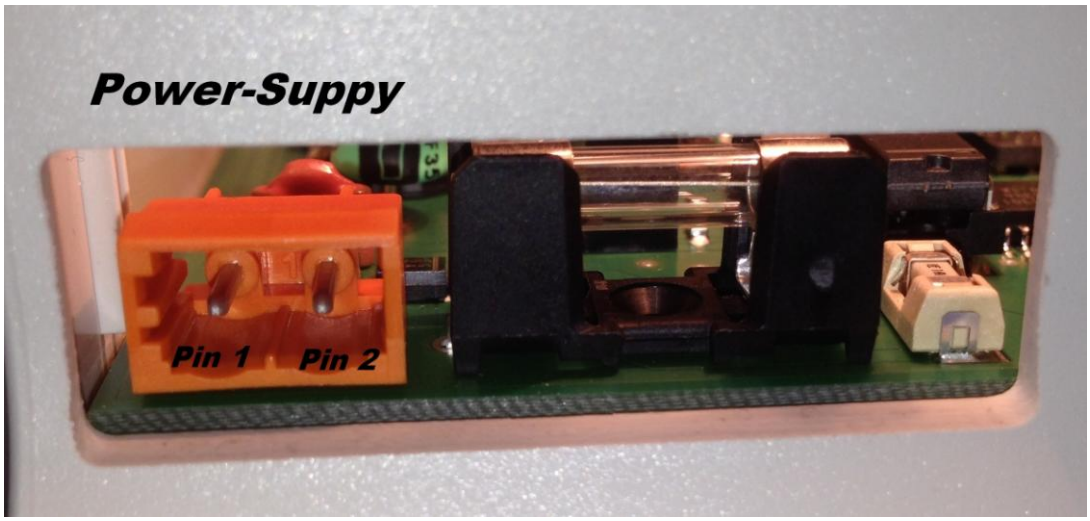


Figure 3: Supply Pin Configuration

Pin 1 +24V (controlled DC)
Pin 2 Power supply ground

3.2 Control Output Pin Configuration

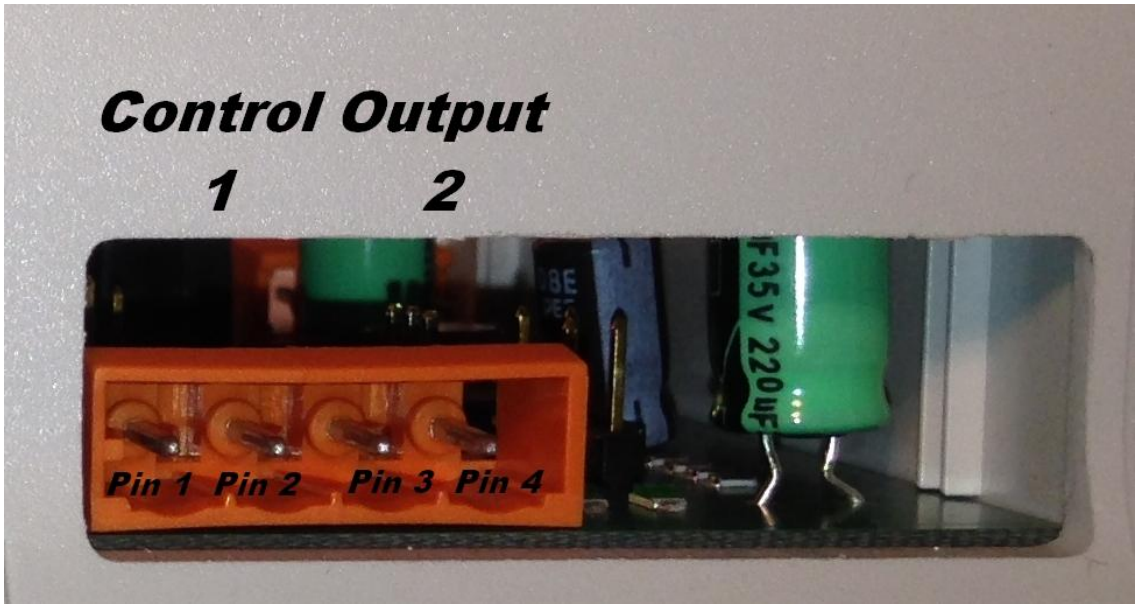
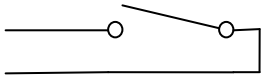


Figure 4: Control Output Pin Configuration

Controll Output I

Pin 1 K1
Pin 2 K2

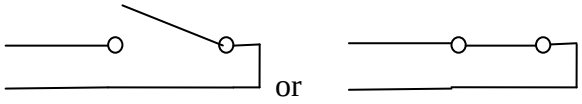


In switched state K1 and K2 are electrically connected.

Controll Output II

In switched state K3 and K4 are electrically connected.

Pin 3 K3
Pin 4 K4



For the Control Output 2 there are two possibilities.
With the Jumper 1 (pictured below) is set if the output as normally open or closed in switched state. Without Jumper the Output is not aktiv.

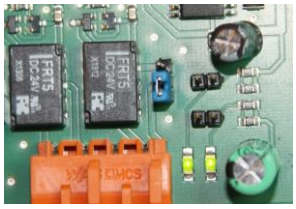


Figure 5 : Jumper Setting

3.3 Inputs

The input signals of the temperature sensors ,the oxygen sensor and the pressure sensor are processed as analog currents of 4 to 20 mA. The inputs are momentarily protected against over-voltage and electrical interference.
For details please see the “Technical Specifications” table.
Only connect measuring sensors authorized by EHS.

3.4 Outputs

The control output is designed as a potential-free make contact with a maximum load of 30 V and 1 A. The control output is used in the system to operate a relay (usually 24V relay) which again controls the fan.

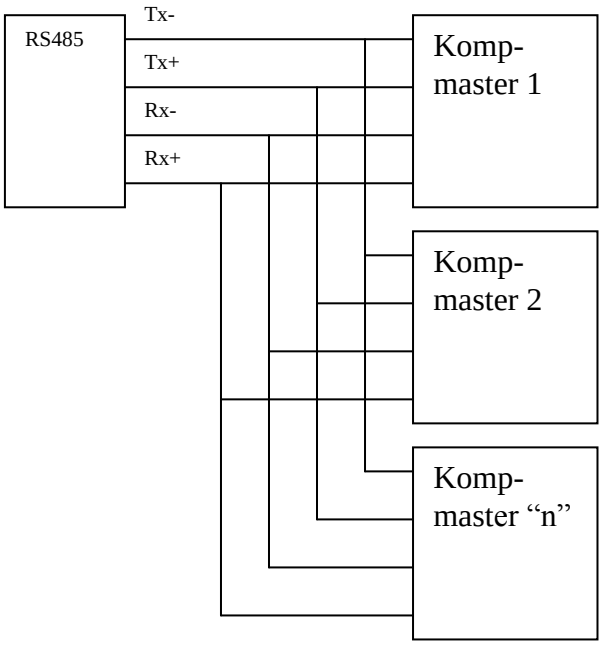
Switch “open” = Signal blocked Switch “closed” = Signal switched

Direct control of bigger loads than specified, e.g. a fan with higher voltages and currents is prohibited and will damage the control unit.
The device is exclusively designed for low voltage. Non-observance of this specification makes any warranty claim null and void.

4 Interfaces

One interfaces to the control PC.

In networked operation via RS485, up to 32 units can be operated at one PC interface. Since this is not a standard PC interface, suitable converters must be used. The RS485 interface is operated in 4-wire full-duplex mode. The device address is specified by way of two coding switch (once and tens digit), which is varied in th**e** range 0-10. The control units are connected to each other and to the interface converter using a four-data-wire line. The line can be shielded, but **the shield must not have a second electric connection to the earthing bus or to the casing**.
The wiring diagram is as follows:



Using this method a distance of max. 200 m is permitted, adding up the lengths of all cables from the converter to the last control unit in the network. For larger distances the use of fiber optics is recommended, alternatively signal amplifiers for the RS485 bus can be used..
When using fiber optics, the individual units are connected to each other up to the RS485/fiber optics converter using cables. The transfer to the remote office building is carried out by means of fiber optics and re-converting to RS485 or—if connecting directly to the PC—to RS232.
Setting the network address is described in the “Setting the Address” chapter.

5 Indicator Lamps

A total of four LEDs are used to indicate various parameters of the control unit.
With the LEDs, the correct operating voltage supply of both the electronics and the sensors can be checked. In addition, there is an indicator showing whether the control unit actively participates in the data communication with a connected control computer.
The fourth indicator is integrated into the housing and indicates the proper function of the control unit by cyclic flashing (1 second on/1 second off).

5.1 Location of the LED's

The LEDS are located at the positions illustrated and are allocated as follows:

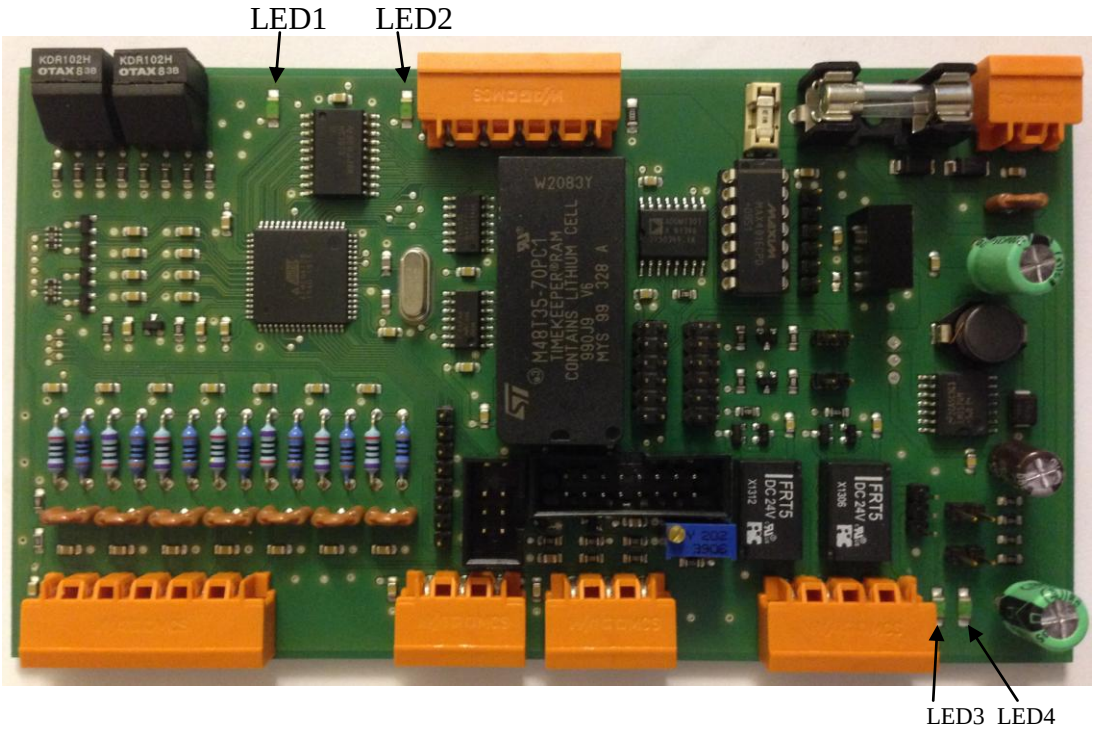


Figure 6: Layout of the LEDs

1) Indicates the correct function of the control unit by cyclic flashing (1 second on/1 second off).

2) Communication indicator: This LED lights up momentarily when the control sends data to the control computer at the control computer's request.

3) Operating voltage indicator: This LED must light continuously and indicates that the internal supply of the control unit is correct.

4) This LED indicates whether the Sensor supply is applied correctly.
Must light continuously , otherwise the fuse of the sensor supply has blown. In this case you must replace it .

6 Replacing the Fuse

If the sensor supply is not applied correctly, there is a high probability that the fuse has blown. To make the system operational again you must replace the fuse.

Before replacing the fuse, the cause for the fault must be located and eliminated.

You must check all connectors and cables to the sensors , and repair them if necessary before replacing the fuse. A permanent short-circuit can damage the control unit. Before replacing the fuse, please pull the connectors of the sensors out of the control unit.

Caution:
Before opening the housing, unplug the power supply to prevent short-circuits inside the control unit!!!

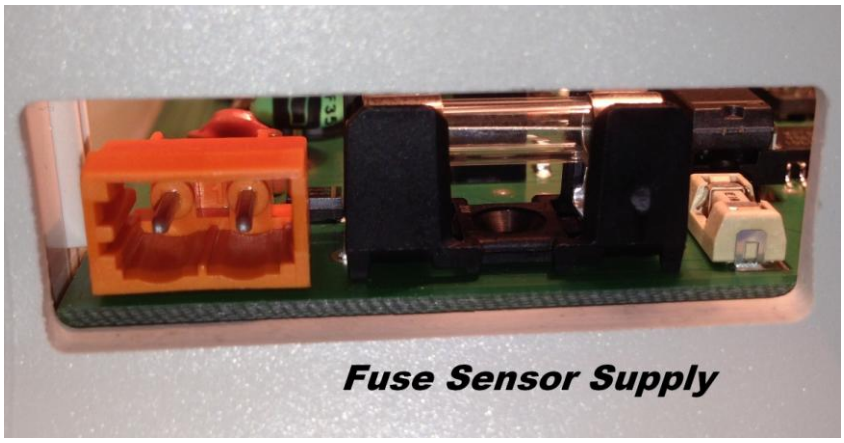


Figure 7: Position of the Fuse Holder

To replace the fuse:

- Open the housing and replace the fuse
- Check whether the fuse really is damaged and replace it with a new fuse, if necessary. For the technical specifications of the fuse please see the “Technical Specifications” chapter.
- Now check the operating voltage indicator of the sensor supply. The corresponding LED (see “Operating Indicators” chapter) must be on.
- If this is the case, at first connect only one sensor to the control unit and check whether the operating voltage indicator is still on or whether the fuse has blown again.
- If the fuse has blown again, the sensor is defective and must be replaced.
- Carry out the last two steps for the second sensor.
- If, after connecting both sensors, the operating voltage indicator lights up continuously, the system is operational again.

7 Setting the Address

In order for the PC software to separately acquire and archive the data of each control unit, each control unit must have an individual address that is different to those of the "Kompmaster" devices. The address range is from 1 to 32.
The two codeing switch for setting the address is shown as below:.

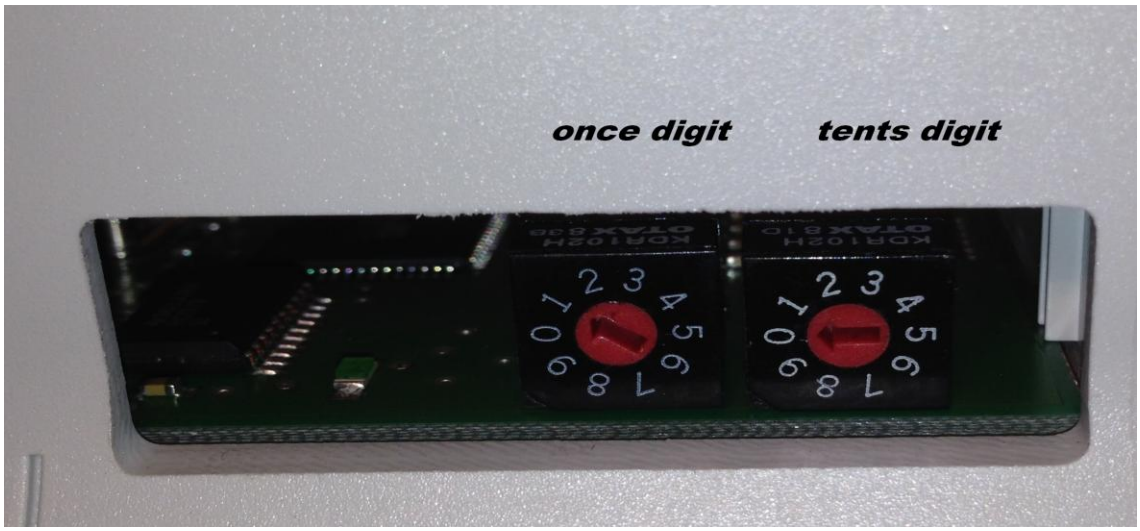


Figure 8: Micro Switches for Setting the Address

Example:

Adresse 01 : set once digit to 1 and tens digit to 0
Adresse 25: set once digit to 5 and set tens digit to 2

8 Data Storage

The control unit is equipped with buffered RAM, which “stand alone” stores the current measured values in the integrated battery-buffered memory at intervals set by you, independent of a connected PC. This data can be downloaded and archived with the PC software at any time. This procedure is described in the PC software manual.
The archiving intervals can be set by you. Depending on the storage interval selected, the integrated memory of 1000 measured value blocks lasts for a shorter or longer period.
Example:

- If the archiving interval is set to 1 min, the 1000 measure value blocks correspond to 1000 min = 16 h 40 min
- If the interval is set to 1440 minutes = 1 day, the memory size lasts for 1000 days, which is more than 2½ years.
- A storage interval of 60 min has proven to be practical. With the integrated memory size, data of more than 1000 h can be recorded.
  1000 h = 41 d 16 h.

This logs a complete composting cycle in the memory.
You should download and archive the measured data from the control unit in time before the memory is completely filled.
If you missed reading out the measured data on time and the number of 1000 measurement cycles is exceeded, the current measured values continue to be logged and the oldest measured values are deleted, ensuring that the last 1000 measured values are always stored and you can prove the current status of the composting process.

During non-networked operation, you must collect the data regularly.
The networked operation allows for automatic data storage. For details please see the software manual. Here, all systems connected are addressed at the time specified by you and the data is loaded and stored on the PC.
During downloading of the measured data, an implemented fault protocol prevents data loss during faults of the data transfer.

9 Notes

The device is designed exclusively for low voltage. Non-observance of this specification makes any warranty claim null and void.

Only connect low voltage to the control output.

Only connect measuring sensors authorized by EHS or UTV to the control unit.

Only use the interfaces and cables provided by EHS/UTV to connect the control unit to the computer.

Only use replacement fuses which comply with the specification. Fuses with other values can cause damage to the control unit.

Eliminate all faults immediately and carefully.

Before opening the housing, unplug the power supply to prevent short-circuits inside the control unit!!!

To not use pointed or sharp objects when working on or around the opened electronics.

Make sure that no water penetrates the housing.

Proceed with great care when setting the composting control unit! The result of the composting process directly depends on it.

Regularly save the logged composting data on the PC.
Back up your data regularly.

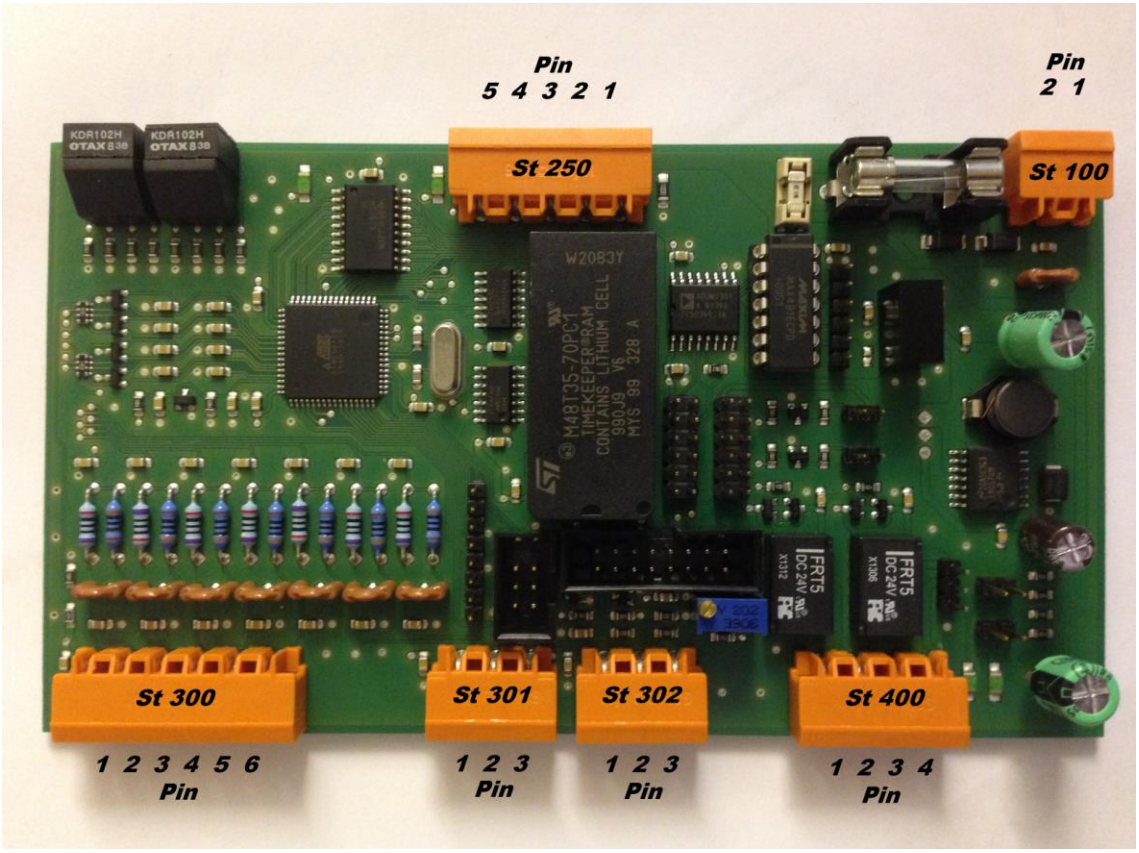
Observe the notes and technical specifications in the manual.

Important:
The shield of the data-line must not have a second electric connection to the earthing bus or to the casing.

10 Power supply

To supply the control unit a power supply unit with max. power of 100W has to be used!

11 Connector Assignment



St 300 Temperatur-Sensor:

Pin1 (24V) Pin2 (T1) Pin3 (T2) Pin4 (T3) Pin5 (T4) Pin6 (T5)

St 301 O2-Sensor:

Pin1 (24V) Pin2 (Signal) Pin3 (Ground)

St 301 Pressure-Sensor:

Pin1 (24V) Pin2 (Signal) Pin3 (Ground)

ST 400 Control Output I and II:

Pin1 Pin2 (potential-free switch) Pin3 Pin4 (potential-free switch)

ST250 RS485 Interface Connector:

Pin1 (Ground) Pin2 (Tx-) Pin3 (Tx+) Pin 4 (Rx-) Pin5 (RX+)

ST100 Powersupply 24V:

Pin1 (24V) Pin2 (Ground)

Technical Specifications

Device type	O2 Kompmaster
Nominal voltage	24 V DC
Supply voltage	22.0 ... 24 V DC controlled
Polarity protection	Yes (–24 V)
Power consumption without sensors	200 mA
Current consumption [1]	1.0 A
Peak current [1]	1.5 A
Fuse of sensor supply	1.6 A slow
Connectors	1- temperature measuring sensor 1- oxygen measuring sensor 1 – pressure measuring input 1- RS485 2- control output 1- power supply
Control output 1 Control output II	1 potential-free make contact 1 potential-free make contact
Control output load	Max. 30V / 1A
Short-circuit proof	All inputs and outputs 30 sec. against supply and ground
Operating indicators	4 LED internal
Memory	Static RAM with battery buffer min. 8 years, 1000 records memory size
Real-time clock chip	Yes
Interface protocol	2400 baud, n, 8 up to 9600
Operating temperature	–10 ... +50 °C
Protection class	IP20
Material of housing	plastic Din Rail
Weight	0.2 kg

1 With temperature and oxygen measuring sensor connected

List of Figures

